

Dear Readers! Have a fishful, happy and prosperous 2002

FISHING CHIMES

Upgrades Capabilities, Augments Output

- Chilika Lagoon : Fishery Dynamics and Management
- Management of weeds in Large Impoundments
- Resp. Fisheries in Marine Ecosystem : Reykjavik Conf.
- CIFT - TED : Constructing, Installation and operation

DECEMBER 2001

Vol. 21 No. 9 National Fisheries Journal of India: Estd 1981 Rs 65



**Where
Excellence
is
the
prize
catch**

NEKKANTI SEA FOODS LTD.,

(A Govt. of India recognised Trading House)
#1, Jayaprada Apartments, Nowroji Road,
Maharanipeta, Visakhapatnam- 530 002 INDIA
Ph: (O) 567767/701039 Fax: (891) 567504
E-Mail: nekkantifoods@eth.net
Visit us at: www.nekkanti.com



Latest in eco-friendly

AQUA

products



SHRIMP FEED



SCAMPI FEED



FRIENDLY BACTERIA



HATCHERY FEED



**Designed to succeed!
Save environment. By using**



Good Quality Feed

Healthy Baby Shrimp



***Proper Management with
awareness of impact on environment***



C P Aquaculture (India) Ltd.

104 GNT Road, Nallur & Vijayanallur Village,
Sholavaram Post, Red Hills, Chennai 600 067.

Tel: 6419467, 68, 6419545, 46, 47 Fax: 6419466, 6419544

A spectrum of feeds for your aqua needs



Artemia : Biomarine, Ortemia and other brands.

Micro Mac 30 & 70 : Zoeal, Mysis and PL feeds, highly popular microencapsulated diets.

Algamac 2000 : Zoeal & Mysis feed, Replacement substitute for live algae & more.

Spirulina dry algae : Zoeal & Mysis feed for larval disease prevention and higher survival.

Brine Shrimp Flakes : Mysis through PL-A composite diet containing marine proteins and artemia.

Artemac : High HUFA artemia replacement

diet upto 70%. A complete balanced micro encapsulated diet available in 5 sizes.

HYMAC PL Economy : A new high quality affordable PL feed, Vitamin A enriched particulated diet in 2 sizes.

HYMAC PL Feeds : Microencapsulated high HUFA enrichment diets for early & post larval stages.

Nutramac : "A new nursery feed to improve immunity and stress reduction diet available in two sizes."

Treflan : High popular fungicide and algicide for hatchery & grow-out ponds.

We also provide Aqua chemicals, Instruments & Test Kits from world renowned companies



Commitment to quality nutrition

ORBIT INTERNATIONAL

Corporate Office : 404/405, IV Floor,
Golden Edifice, Khairatabad, Hyderabad - 4.
Phone : 3326463, 33025256 (5 Lines)
Fax : 3734183, E-mail : orbitech@hd1.vsnl.net.in

Nellore :

Shop No. 6, II Floor
SVS Complex
Achari Street
Nellore - 524 003
Ph : 0861 327914

Kakinada :

VST Enterprises
Plot No. 32
Sashikant Nagar
Near NFCL Junction
Kakinada - 533 003
Ph : 0884-351847/349963

Kakinada :

Ammu Enterprises
H.No. : 70-7-61
S.B.I Employees Colony
Krishna Nagar
Kakinada - 533 005
Ph : 088 4358050

Visakhapatnam :

Plot No. 42, MIG H.No. 50-96-8/13
Sittammadhra North Extension
Visakhapatnam - 530 013
Ph: 0891 536304
Fax No: 0891 541389
Cell No: 98481 89329

Ongole :

Sri Jahnvi Aqua Enterprises
Dhacheria Building
Opp. Panduranga Swamy
Kalyanamandapam By-Pass Road,
Ongole - 2 Ph : 08592 38592
Cell : 98481-52533

NEW YEAR GREETINGS

Dear Valued Subscribers, Advertisers, Readers ,
Fishing Chimes Wishes you A Very Happy, Fishful & Prosperous 2002

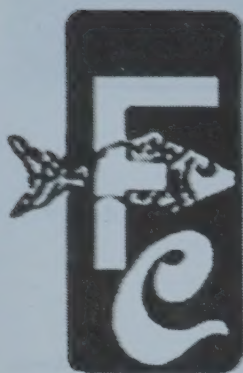
*In the year two thousand two
 We may put together two and two
 And Repent on what all we remember
 of past lapses, all not due to eleven September.*

*Waning prosperity of primary stake holders
 Be they of capture or culture banners
 All due to policy complacency and obsessions
 To swear only by shrimp and major carps*

*Mariculture technologies we have developed
 But couldn't popularise them as we hoped
 Although the produce has an external market
 which remains unexplored rendering farmers complacent*

*Deepsea fleet is stagnant, leaving what we possess
 For others to catch under a garb that all can assess
 Despite the gloomy scenario, can we chronicle
 The new year will cheer us with a miracle?*

*Despite the gloom of declining catches and plummeting prices
 There are emerging factors to neutralise the crises
 With scope for expansion of shrimp culture in freshwater
 And scampi culture poised to make new strides to deliver*



FISHING CHIMES

A monthly journal devoted to the development of Fishery Industries
Upgrades Capabilities ; Augments Output

NATIONAL FISHERIES JOURNAL OF INDIA

Vol. 21 No. 9
DECEMBER 2001

CONTENTS

Fishery Dynamics and Management of the Chilika Lagoon

Fish and prawn yields from Chilika, the largest brackishwater lagoon in the Indian sub-continent, are now beset with a downward trend. Rajeeb K. Mohanty and his associates are confident that, this trend is transient and that the fishery would revive soon, same way as it had happened several times earlier. In this contribution, the authors, while explaining the four eco-systems of the lagoon and bringing out the factors governing its fishery dynamics, trend of its fisheries, and the present status of its fishery, suggest a set of measures for the management of the fishery resources of the lagoon.....7

Management of Weeds in Large Water Impoundments

G.N. Mitra and S. Patnaik, pointing out the successful experiments conducted by them in clearing weed infestations in Kausalyaganga and Ainsuppa waterspreads in the past, suggest three alternative methods for the management of weeds in large impoundments. One of this is prevention. Another is adoption of commercial methods of dewatering as was done in Kausalyaganga and Ainsuppa. The third alternative is to entrust dewatering work to competent private sector enterprises in a manner that evoke interest in them to take up this challenging work. They also explain details of a comprehensive study conducted in a reservoir located in the South for eradication of weeds.....13

Third World Aquaculture and the Environment

An incisive analysis of the present status of third world aquaculture, along with viable suggestions for upgrading the activity, is presented in this contribution by Kitoo, Reghunathan and Babu. They say that environmental degradation is not a problem of relationship between people and their habitats but one of a relationship between competitors for access to productive resources.....17

The Reykjavik Conference on Responsible Fisheries in Marine Eco-system

This Conference (1-4 October 2001) attended by representatives from 58 member nations of FAO and several others, identified lines of action to effectuate responsible fisheries in marine ecosystem and declared that the participating nations would individually and collectively work on incorporating ecosystem consideration into the related management to realise the aim. Details.....47

Other Inclusions : Management of Weeds in Large Water Impoundments-12; Potential of Artificial Substrate - Based Microbial Film in Aquaculture-14; Colour Changing *Puntius* species, a locally available ornamental fish of Meghalaya-15; Inland Fisheries Research Needs of North-East India: Regional Consultation-19; Training Workshop on 'Breeding and Culture of Catfishes of India'-21; North - Eastern Regional Centre of CICFRI Inaugurated-23; Aquaculture and Environment-26; Fishing in the Indian Ocean-33; CIFT-TED: Construction, Installation and Operation-35; Rehydration Capacity of Different Dried Prawn Products-38; Award of Medals and Release of Cifnet Publications-40; Sea Food Safety: What Exporters must know about HACCP-42.

Regulars : Editorial ~ Lined Ponds-5; Newsletters: Andhra Pradesh -51; Orissa -53; Tamilnadu -55; West Bengal -57.

Thank you readers for your growing support

Editor and Publisher

J.V.H. Dixitulu

Address

Fishing Chimes, Chimes House
Sector -12, Plot -176, M.V.P. Colony
Visakhapatnam - 530 017, India
Tel : (0891) 543171, 539319
Fax : 91 - 891 - 539142
Email: fishingbells@satyammail.com

Website

<http://www.fishingchimes.com>

Printed by

G. Ramakrishna
Raamakrishna Printers Pvt. Ltd.,
49-24-5, Sankaramatham Road
Madhuranagar, Visakhapatnam - 16
Tel : (0891) 798072

Registered as a Journal in India
(No. 37750/81)

Resident Editors

Vijai Dev Singh
A2/91, Paschim Vihar, New Delhi - 63

H.S. Badapanda
Anandnagar, College Square
Bolangir - 767 002

J.V.R. Gopal
Sneh Co-operative Housing Society Ltd.,
B1/1/3, Sector - 19A, Nerul, New
Mumbai - 400 706

ANNUAL SUBSCRIPTION

Inland Rs. 780/-
Foreign US \$ 72

Representatives

A.P.	: K. Simhachalam
Bihar	: A.K. Singh (Dr.)
Gujarat	: K.R. Narayanan
Karnataka	: H.N. Chandrasekharaiah
Madhya Pradesh	: R.P. Tuli
Punjab	: M.S. Johal (Dr.)
Rajasthan	: V.S. Durve (Dr.)
Tamil Nadu	: R. Jayaraman (Dr.)
U.P.	: Sunit Kumar Singh
West Bengal	: P.K. Samanta (Dr.)
Washington D.C	: Santhi Jammi

MORE
THAN JUST

QUALITY



Once step ahead of a changing world

Devi sea foods has always been
in the forefront of delivering
excellence in product & process.

The manufacturing practises at
Devi are stricly in accordance with
HACCP and EU guidelines and
quality levels are constantly
monitored at every stage
to ensure the delivery of the best
product to the ever changing
needs of the global market.



Product profile

The phenomenal growth in exports
and ever increasing customers of
Devi Sea Foods, all over the world,
is a clear testimony of the valuable
products which are delivered to it's
discerning buyer.

Devi's product range include :

*Indian black tiger/fresh water shrimp
(farm raised)

*Head less /Head on

*PD tail on/ PD/ PUD

*Butterfly..etc.... all in IQF / Block
frozen form and Internationally
marketed under the global brand
names **Devee star, Devee special,**
Navee, Navee star.

DEVI SEA FOODS LIMITED

Corporate office :
9-14-8/1, CBMCompound,
Visakhapatnam AP 530003
India
Ph: 91-891-567082, 525337
Fax:91-891-563828

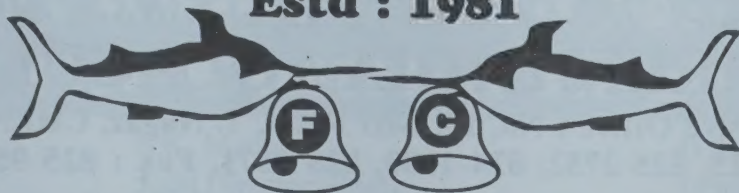
Processing plant :
3-79/2, Moolaguntapudu,
GT Road, Singarayakonda,
Ongole, AP 523101 India
Ph:91-8598-36397
Fax:91-8598-36330

Processing plant :
NH5, Peravali Road,
Tanuku, WG district
Ph :91-8819-21488
Fax :91-8819-21489

Please mail your queries to: dsfltd@vsnl.com website : www.deviseafoods.com

Estd : 1981

Visakhapatnam, India

Vol. 21 No.9
DECEMBER 2001

FISHING CHIMES



Lined Ponds

The system of covering the bottom and sides of fish ponds with high density polyethylene sheets is spreading fast in several countries. The reasons for this are simple. It becomes often difficult to completely remove the accumulated sludge from pond bottom. This drawback often turns out to be congenial to disease incidence during the culture phase. Further, the removal of sludge from the bottom as part of pond preparation for the next crop takes not only considerable time but often turns out to be incomplete. The transposition of a barrier (High density polyethylene sheet) between the bottom soil and the superjacent water column prevents mixing of the wastes with the bottom soil. Further, it facilitates the removal of the wastes such as faecal matter and left over feeds fast with a measure of thoroughness. This enables the commencement of the next culture cycle in the shortest possible time after a harvest. Another advantage is that a farmer need not worry about possible inimical bottom soil composition anymore. Another stated advantage is that the number of aerators for use can be reduced (two aerators are enough for a 2000 sqm pond, it is stated, and this helps in saving energy costs. HDPE sheathing used for pond lining is estimated to last for around 15 years. The additional capital expense involved for lining a pond with HDPE will prove to be economically beneficial, as the augmented returns through higher production will pay back the investment on the lining in a few years. Higher production comes from reduction of risks of disease incidence and improved growth because of cleaner environment, and possible savings in feed costs.

While lined ponds are advantageous in several respects, it has to be borne in mind that the advantages will accrue only when there is an alert management. For example, in lined ponds water transparency will be high, because of the separation

of water from the bottom. For this reason, growth of phytoplankton tends to be deficient. This naturally affects zooplanktonic growth too. In order to solve this problem, experienced farmers having lined ponds resort to fertilisation of pond waters so as to encourage growth of phytoplankton.

It is desirable that the Central Institute of Freshwater Aquaculture conducts experimental culture of shrimps/prawn/fish in a lined pond in order to formulate a standard technology and to bring out the economics of culture of various commercially important species. The results of such an experiment can be popularised among farmers, once these are seen to be beneficial to them, through training and field extension programmes. Work of this nature can also be undertaken by the Central Institute of Brackishwater Aquaculture, Rajiv Gandhi Centre for Aquaculture of MPEDA at Mayiladuthurai, in Tamilnadu and at the sub-centres of Central Institute of Fisheries Education.

Colleges of fisheries and university departments imparting fisheries education having attached farms can also conduct culture experiments in lined ponds for demonstration to their students on one hand and to assess results on the other.

A recent survey conducted by Global Aquaculture Alliance revealed that several farmers in Americas have taken to pond lining technology and most of them reported positive results. In Asian countries (Malaysia and others), all farmers who have adopted this technology and responded to the survey of GAA reported positive results from lined ponds. One conclusion of the survey is that, as confidence increases, use of lined ponds could gain greater acceptance. ☺☺

"A Super Market for Aquaculture Products"
SOUTHERN INDIA AQUACULTURE

Administrative Office : No. 19, Giri Road, T. Nagar, CHENNAI - 17
Phone: 825 5825, 825 2752, 824 1580, 828 2871, Fax : 825 9524, 824 1596

E-mail: siac@eth.net & southernindia@vsnl.com

FOR HATCHERIES

O.S.I. ARTEMIA, SPIRULINA, BRINE SHRIMP FLAKE, HIGASHIMARU (0,1,2,3), HATCHE FRY ENCAP (0,1,2,3), NIPPAI B.P., BLACK GRANULES, AIR STONES, AIR TUBING, TREFLAN, PREFURAN, UNDER WATER TORCH LIGHT, SEA GRASS POWDER (0,1,2), ANTIBIOTICS / VITAMIN 'C', MICRON NETTINGS (SWISS & INDIAN), HI-BLOW PUMPS, TEST KITS, CARTRIDGE FILTERS, FILTER BAGS.

FOR FARMS

TEA SEED POWDER, ZEOLITE, BACILLUS SUBTILLIS, D-BEST, POND BACT, SITTO MINERAL MIX, FISH OIL, B.K.C, IODINE

AUTHORISED DISTRIBUTORS FOR:

- ❖ O.S.I MARINE LAB, INC, U.S.A
- ❖ INVE (THAILAND) LTD.,
- ❖ HONG TAI PHARMACEUTICALS, SINGAPORE
- ❖ ARGENT CHEMICAL LABORATORIES, U.S.A

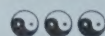
Note: We do not have any branches in Andhra Pradesh. We directly deal from our head office in Chennai.

India's Coastal Aquafarms

There are 1,250 farms out of which 1,051 fall within CRZ covering an area of 1,936 ha. 199 farms lie outside spread over an area of 1,048 ha. Among the farms within CRZ 229 are sea based, 791 are creek based and the rest lie in Pulicat Lake.

The Aquaculture Authority of India

(AAI) has so far granted 2,205 licences and the state-wise details are as follows (NO. of licences in brackets): West Bengal (573); Orissa (530); A.P (222); TN (87); Pondicherry (6); Gujarat (187); Maharashtra (98); Goa (48); Karnataka (127) and Kerala (327)

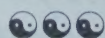


Development of shrimp farming in Pakistan

The Director of Research and Development Sindh, Waheed Ahmad has said that the coastal belts along Badin and Thatta would be developed for shrimp and fish farming to help the local people overcome their financial difficulties.

He said that fish and shrimp breeding was severely affected in lower Sindh due to shortage of water in rivers.

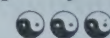
Waheed said that the Shrimp Breeding Project at Gharo has been revived and research on shrimp and fish would resume from August next year.



Shrimp waste to pharmaceuticals

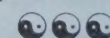
Indonesia's Marine and Fisheries Ministry together with PT Philip Seafood and a German company plan to build a factory to process shrimp and squid waste into preparations widely used in the pharmaceutical industry.

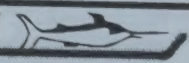
In the first phase, investment is estimated to be Rp800 million to provide a facility with a processing capacity of 10,000 tons a year.



Fishing in Andaman EEZ

Around ten trawlers from mainland have moved into Andaman EEZ, primarily for shrimping. It is stated that the catches are not upto expectations and there is some measure of apprehension that the operations may end up hopefully at break-even level.





Fishery Dynamics and Management of the Chilika Lagoon

Rajeeb K. Mohanty
Scientist

Water Technology Centre for
Eastern Region (ICAR)
Bhubaneswar-751 023

S.K. Mohanty
Joint Director (Retd)
(Orissa Fisheries Department)
VIM-52, Sailashree Vihar
Bhubaneswar-751 021

H.S. Badapanda
Deputy Director (Retd)
(Orissa Fisheries Department)
Vanishree Vihar, Anand Nagar
Bolangir - 767 002

Chilika, the largest brackishwater lagoon in the Indian sub-continent, presents unique ecological features. The lake embodies marine, brackishwater and freshwater environments and is the home of endemic and migratory species of fish, prawn and crab, which enrich the fishery resources of the lagoon. Noticeable changes have taken place in the lagoon since mid sixties of 20th century, comprising siltation, bathymetry, tidal ingress, spatio-temporal pattern of salinity, weed coverage etc. These changes became noticeably prominent from mid-seventies of the 20th century. Various problems related to fisheries, siltation, salinity regime, environment and pollution in the lagoon have been a subject of focal discussions at various forums during the recent years.

Fisheries has been the main natural resource of the Chilika lagoon which the local fishermen have been exploiting from time immemorial for their livelihood. Over years there has been an increase in fisher population dependent on exploitation of Chilika fisheries to over one lakh and this has led to an increased and unregulated fishing pressure on the resources of the lagoon. Collective impact of several inherent and external stress factors on the lagoon ecosystem has resulted in an inexorable drop in fish production from 1988-1989 onwards, registering the lowest production of 1274 tonnes in 1995-96, providing a per capita catch of around 13 kg and accentuating the already impoverished status of Chilika fisher population. This is apparently an alarming situation, in the light of the common and justified perception that sustainable development of Chilika fishery resources is number one thrust area in the management of Chilika lagoon.

General Features of the Chilika Eco-System : Four Ecological Sectors

Chilika is a pear shaped lagoon with a waterspread area of about 790sq.km at its lowest water level and about 1050 sq.km at the highest water level, including 42 sq.km total area of channels connecting the lagoon with the Bay of Bengal. One of these channels connect with the outer channel, which is narrow and long (35 km) and runs in a north-easterly direction. There is another 14 km long canal, known as Palur canal which was once connecting the southern end of the lagoon with the mouth of Rushikulya river, but the link does not function at present due to heavy siltation of the canal, particularly towards the lagoon end.

In the outer channel that runs in a north-easterly direction, as mentioned above, inflow of sea water through semi-diurnal tides dominates during December-June and thereafter freshwater flow into the sea from July to November through the channel becomes prominent, because of monsoon drainage from 53 rivers and rivulets into the lagoon, particularly in the northern sector. Mixing of saline and freshwater in the main lagoon generally takes place during summer (March-May). Water circulation pattern is generally weak as the semi-diurnal tidal water has to traverse over a long distance in the inlet or outer channel. These conditions have caused spatio-temporal stratification of salinity forming four ecological sectors namely, shallow northern sector where freshwater conditions prevail for a longer period, central sector where moderate salinity prevails, deeper southern sector with comparatively higher salinity and the outer channel sector showing wider variations in salinity. These features have favoured

the dominance of freshwater fish and prawn species in the northern sector, brackishwater species in the central and southern sectors. Marine and brackishwater species are more common in the outer channel.

Fish Fauna and Economic Species

A total of 225 fish and prawn species have been recorded from the Chilika lagoon. Of these, 28 species are marine, 38 are freshwater and 159 are brackishwater. Fish species that are commonly caught by fishermen in the lagoon comprise 11 groups of their commercial importance and quantity of landings. These consist of brackishwater prawn, mullets, clupeids, perches, threadfins, catfishes, fishes belonging to Beloniformes, sciaenids, cichlids, tricanthus and miscellaneous ones including freshwater fishes, freshwater prawns and brackishwater and marine fish species. The commercial fishes of the lagoon contribute to more than 54% of the total annual average landings. All endemic fishes breed in the lagoon during April to September. Mullet, seabass, threadfins and penaeid prawns migrate from lake to the sea for breeding and their progeny (Fry and juveniles) migrate from sea to the lagoon, providing a major means of recruitment to the fishery.

Factors governing the Fishery Dynamics in the Chilika Lagoon

Changes in the breeding performance of important economic fish species and prawn, recruitment pattern of fishery of commercial fishes, fluctuations or declining trend of fishery, seaward migration of prime fishes like mullets, sea bass, threadfins etc., incursion of fish and prawn post larvae into the lagoon, changes in the percentage composition

of fish and prawn catches, trend of crab fishery etc., in the Chilika lagoon are governed by the following factors.

1) Shifting of mouth position in the inlet (outer) channel of the lagoon towards north increases the distance water has to traverse to reach the lake. This results in poor tidal ingress and weak circulation in the lagoon. It also affects the migration of post-larvae of many economic fish and prawn species into the lagoon. This in turn affects the recruitment pattern of fishery adversely. It also decreases the salinity level in the main water body of the lagoon encouraging the growth of freshwater weeds.

2) Breeding performance of fish has a direct bearing on pattern of fishery recruitment and productivity. Therefore natural migratory path of catadromous fishes would have to be kept free during breeding migration. Further, breeding grounds of endemic fishes and crabs, including mouth zone of Daya river and lagoon mouth, should be protected for unhindered breeding of fishes.

3) Salinity regime of the Chilika lagoon is one of the important limnological factors in brackishwater / estuarine ecosystem which brings about critical changes in the species diversity (Bio diversity). Decrease in salinity would increase the freshwater species and their catch. Favourable range of salinity would help in the enhancement of brackishwater fish stocks and their population.

4) Siltation of Daya river mouth in the northern sector has adversely affected the breeding activity of Ilishi fish, *Hilsa ilisha*.

5) Unregulated fishing in such a unique ecosystem as of this large brackish water lagoon would have negative impact on the trend of its fishery which may prove to be responsible for fishery depletion situation of the lagoon in the long run. Large scale fishing mortality of broodstock and juveniles would seriously affect the breeding activity and reduce the size groups in the commercial catches.

Stress Factors and Fish Production

The internal hydro-biological processes in the Chilika lagoon such as, sedimentation due to large quantity of silt discharged by 53 rivers and rivulets during monsoon, and organic deposition from decomposed weeds, salinity variations and spatial stratification are influenced by weak circulation due to reduced impact of semidiurnal tide. Explosive weed growth covering the waterspread area (WSA) at an alarming rate during last three decades, and deeper southern basin with no fluvial influence cause a collective stress condition that is inherent to the Chilika Lagoon's natural ecosystem.

The external stress impact on the lagoon's ecosystems comes mostly from human interferences/activities such as, operating fish processing plants on the shore line which discharge untreated waste/effluent waters with high BOD into the lagoon, prawn culture gheries that cause localised pollution and scour earthen roads and saline dykes over the natural water channels, uncontrolled fishing pressure caused by increasing fisher population, large scale exploitation of prawn seed from the wild, forest destruction in the catchment areas, increased use of motorised boats leading to oil pollution, drainage of agricultural pesticides etc. Both the inherent and external stress impacts on the ecosystem of the Chilika lagoon ultimately affect the fisheries resources, accentuating the declining trend in fish yield.

Aquatic vegetation, which has been considered as the single largest factor in the lagoon's ecology, covered nearly 41,000 ha of area in 1993. Continued prevalence of low salinity has influenced rapid growth of freshwater macrophytes in the shallow parts of the northern sector for the major part of the year.

Trend of the Fishery

Trend of the fishery of the lagoon during the period 1949-50 to 1999-2000 (51 years) showed three modes of upward and downward trend (Fig-1) and at times took even 12 years for the revival of earlier upward position. As such, the present downward trend from 1983-84

onwards cannot be construed with certainty as an alarming decline, particularly as there are indications of recovery during the recent years. Further, the declining trend cannot be presumed prematurely as the size groups in the commercial catches of most of the economic fishes have not shown any declining trend, although a shift in the dominance of certain uneconomic autochthonous species over the economic varieties is perceptible. However the trend of decline of crab fishery is presently alarming. So far as finfish catches are concerned, although the catches plummeted to a very low level of 1274 t by 1995-96 from 8873 t landed in 1986-87, it is heartening that there is some improvements in the quantum of catches thereafter.

Present Status of Fishery of Chilika Lagoon

The following features characterise the present fishing status of Chilika lagoon.

a) Fish and prawn catches have declined drastically during 1990s (lowest being 1274t).

b) Constant decrease in waterspread area, drop in salinity level, rapid weed growth, siltation, shifting of lagoon mouth and other general ecological changes have together contributed to poor fishery.

c) Ghery prawn culture which was started in the Chilika Lagoon during 1985-86 on a limited scale, became widespread covering even the open Chilika water body by 1998-99. This kind of aquaculture practice in the lagoon has been adversely affecting the capture finfish and prawn fisheries and also leading to serious law and order problems.

d) Traditional fishery and fishing grounds have been adversely affected due to ghery prawn culture.

e) Pressure on capture fishing in the lagoon has increased several fold, with nearly 30,000 active fishermen engaged in the activity.

f) The fishery of autochthonous and forage fish fauna of the lagoon has domi-

nated over the prized prawn and mullet fisheries of the lagoon and

g) Decline in crab fishery has been noticed.

Likely Impact of The New Lagoon Mouth on The Fisheries Resources.

On the recommendations of the Central Water and Power Research Station, Pune the Chilika Development Authority, Bhubaneswar has opened a new mouth to the lagoon near Ramabhatia by dredging, which has become functional from 23rd September, 2000. The new mouth is likely to be helpful in augmenting the fishery resources of the lagoon, as indicated hereunder.

a) Large quantity of mullets and prawn seed along with other immigrant fish seeds would enter the lagoon due to effective tidal impact. Such seed incursion would significantly contribute to the recruitment to lagoon fisheries.

b) Seaward breeding migration of mullets/prawn and their breeding performance will be more effective.

c) Positive tidal impact will improve the salinity regime of the lagoon which in turn will be conducive to growth and breeding of some endemic species.

d) The overall improvement of salinity level in the lagoon may prevent explosive growth of freshwater weeds, and

e) There may be addition of some more marine species in the composition of catches in the outer channel sector.

Suggested Measures for Fisheries Resources Management

Institution of rational conservation measures and legislation to improve the present status of the fishery resources in the lagoon is to be given top priority and the salient features of such measures may be as indicated hereunder.

a) Capture of mullets (*Khainga* & *Dangla*) and seabass (*Bhekti*) below 150 mm (6") and Tiger prawn (*Bagda*) below 100 mm (4") needs to be prohibited.

b) Operations of small-meshed fish-

ing nets (zero net) used mostly by the refugee fishermen in the lagoon to catch large quantities of small sized juvenile fish should be prohibited.

c) Known seaward breeding migration routes, of economically important mullets, prawns, seabass etc., particularly through some natural channels in the island areas of the lagoon in K. Prasad Block and Dahikha channel, should be kept free/open by fully removing the illegally set up prawn culture 'gheries'. This would help in the unhindered breeding activities of many catadromous economic fishes and in eventually strengthening recruitment to lagoon fisheries.

d) The outer channel leading to the mouth and the Palur canal between the lagoon and the Rushikulya river mouth should be kept free and no barricades or any other fixed gears would be allowed to be set up to catch prawn and fish. Such a measure would boost up breeding performance and recruitment as well.

e) Mullet fishing in the lagoon mouth should be banned from October to January (breeding season)

f) Capture of prawn seed on a large scale in the outer channel and in the Palur canal should be prohibited round the year.

g) In the outer channel, only net fishing (without 'zero' net) during March to August may be allowed strictly prohibiting any type of fishing during September to February. This is necessary to augment breeding activity of catadromous fishes and movement of immigrant fish and prawn seed into the lagoon.

h) Not more than six leader lines (*Khandathata*) should be allowed to be laid in a prawn ground (*Sairat*) and distance between two leader lines should not be less than 500m. Leader lines should be laid only on one side of the source extending from the land mass up to the main channel or *Bahar Chilika*. In no case the length of the leader line should exceed 800' (244m).

i) Following the traditional system,

fishing operations in different fishery sources continue to be carried out round the year ('Bahani'-Round the year, 'Jano'-January-September, 'Prawn'-February-July and 'Dian'-July-October).

The above mentioned operational periods/durations should not be allowed to be extended and leader lines in prawn grounds need to be removed after July. Capture fishing of prawn sources using nets may be allowed.

j) Fixing any type of barricade in any part of the lagoon for any purpose other than the leader lines in prawn sources and traditional 'Jano' fishing areas should be strictly prohibited. In other words, illegal gheri prawn culture (aquaculture) should be prohibited.

k) Waterspread areas of main Chilika (*Bahar Chilika*) in three ecological sectors should be kept free throughout the year exclusively for capture fishing to be operated by traditional fishermen.

l) No culture fisheries, particularly prawn culture in any enclosed area (enclosed by earthen bunds or bamboo/net screen) which is popularly known as "Gheri Culture" should be allowed to be operated within the lagoon's ecosystem and no traditional capture fishery grounds should be converted for culture purposes.

There should be total ban on prawn gheries in the lagoon which has serious environmental impact on the fishing resources and generates social tension between fishermen and non-fishermen.

m) All existing gheries both earthen dykes and screen walls need immediate removal and further leasing of fishing sources for aquaculture should be stopped forthwith.

n) Dredging of Daya river mouth area (desiltation) is necessary to provide conducive breeding ground for many anadromous fishes.

o) All recorded fishery *sairats* (*Janos*, *Dians* etc.) need immediate demarcation by fixing concrete poles to avoid encroachments and conflicts.

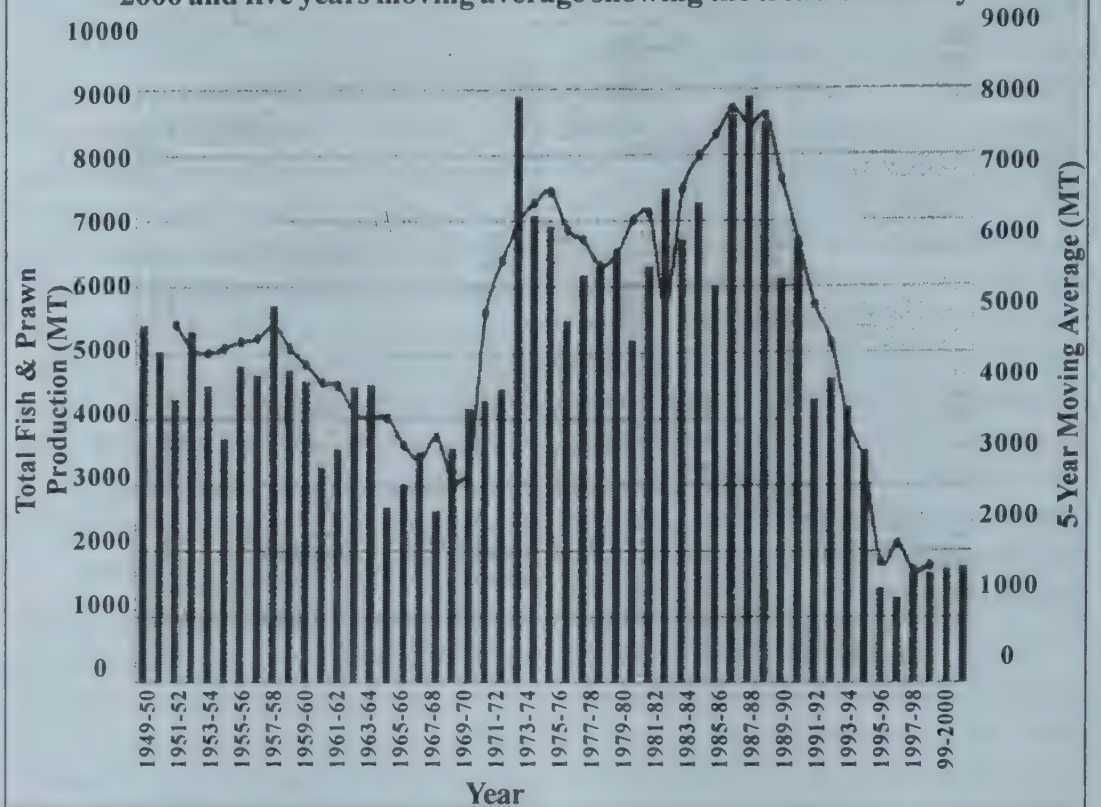
p) It is vitally important to collect fish, prawn and crab catch statistics of the lagoon as a routine activity to assess the trend of fishery, species diversity, species composition, recruitment pattern, utilization pattern etc.

. Increased number of motorised boats has become a matter of concern as they are causing oil pollution. Their operations should therefore be regulated and a limitation of the number of motorised boats to be operated in the lagoon may be imposed.

. Processing plants and ice plants set up along the shore of the lagoon should not release untreated waste water into the lagoon.

Massive awareness campaign among the villagers living in and around the lagoon (resources users) is of paramount importance.

Fish Landings (Including Prawn) in the Chilika Lagoon During 1949-50 to 1999-2000 and five years moving average showing the trend of Fishery



Empowering Women In Aquaculture

P.K.Sahoo

National Research Centre for Women in Agriculture
1199, Jagamara, Bhubaneswar-751030



Releasing of fry in the pond by women participants

National Research Centre for Women in Agriculture is an unique institute of ICAR established in the year 1996. Various projects under different disciplines of agriculture including Animal Sciences and Fisheries are in operation for developing women-specific technologies and disseminating them. Under fisheries, the project entitled "Studies on technological empowerment of women in rural

preparation and Pond Management" and "Induced Breeding of Carps".

In village Simore, attention has been focused on the community fish culture. Ten members of mahila samiti were motivated to take two Panchayat ponds on lease for aquaculture. The two ponds with an average water area of one acre each are taken on lease in the month of August'2000. Out of these two, one pond

aquaculture" is operational in two villages of Khurda district i.e. Khamanga Sasan and Simore under the supervision of Dr(Ms) P.K.Sahoo and Dr. B.N.Sadangi. In Khamanga Sasan individual ponds are taken and 20 women farmers have been given training on "Pond

is left to them to carry out fish culture adopting their traditional method which would in turn serve as the control for this experiment. The second one was used to undertake fish culture following scientific methodology. Participating women were trained on the pond preparation and pond management. Fry of Rohu, Catla Mrigal, Grass Carp and Common carp were released in the month of October 2000. Regular feeding and fertilization of pond are being carried out by the participating women under the centre's supervision. In the beginning the women were very much reluctant to undertake fish culture, but now not only the participating women but also the women of neighbouring villages are showing interest to undertake aquaculture.

Janaki Ram takes over as Director, CIFA

Dr. K. Janakiram, Principal Scientist, has taken over as Director, Central Institute of Freshwater Aquaculture, Kausalya-ganga, Bhubaneswar, Orissa. An outstanding contribution of his in recent years was the development of technology of production of cultured freshwater pearls.

Predictable Profitable Performance

Specially
formulated
BKC 50% for use in
Aquaculture.

Germex-50-Aqua*

Germex-50-Aqua*

Powerful sterilizer, deodorant,
algicide and sanitizer to keep
culture ponds free from
pollution. Very effective for
prevention of bacterial, viral,
fungal, protozoan diseases of
Fish, Prawn and Shrimp.

Unique powerful Iodophor
formulations for use in
Aquaculture.

Pollunex*-2-Aqua
Pollunex*-20-Aqua

Pollunex*-2-Aqua
Pollunex*-20-Aqua

Lethal for bacteria, virus, fungi
and protozoa. Controls water
pollution in Aquaculture.
Safe for use in Fish, Prawn
and Shrimp ponds.

Speciality Zeolite
formulated for
exclusive use in
Aquaculture ponds.

UltraSil*-Aqua

UltraSil*-Aqua

Specifically advocated as
a water quality improver in
Shrimp, Prawn and Fish
ponds to prevent diseases
and help achieve faster
growth and profits.

Speciality
Dolomite for
use in Aquaculture
industry.

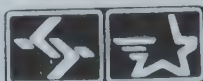
PearlSpar-Aqua*

PearlSpar-Aqua*

Enhances growth and
survival rate of Fish,
Prawn and Shrimp by
promoting biological
productivity.



Neospark



NEOSPARK

Drugs and Chemicals Private Limited

241, B.L. Bagh, Panjagutta, Hyderabad - 500 082, A.P., India

* TRADE MARK

Tel : 091-040-3399351, 3396725. Fax : 091-040-3411806. E-mail : neospark@hd1.vsnl.net.in

Management of Weeds in Large Water Impoundments

G.N. Mitra and S. Patnaik

Professorpara, Cuttack - 753 003

Heavy Infestation of weeds occurs when lotic condition is replaced by a lentic one through construction of weirs, dams or other structures. The degree of infestation depends on the nutrition brought in by flood waters and sewage released into the impounded water. Within a few years of the impoundment, availability of water area for the movement and thriving of fish gets considerably reduced unless the weeds are kept in check.

This article describes the logistics of management of weeds in a large impoundment of a river and indicates a practical approach for management of weeds. The write-up is based on the best of the current knowledge available for weed eradication. It provides a method for large scale management of weeds in reservoirs as evolved in a case study conducted in 1997 at a place in South India. The name and location of the impoundment is withheld as it was the subject matter of a private consultancy.

Physical features: The weir with 16 numbers of automatic falling shutters has a length of 98 m, its total length being 500 m. It has impounded approximately 18 sq. km. of water area extending upto 30 km. of the length of the river. The gates are automatic, water being released at a R.L. above 5 feet and stops at 4.5 feet. Impact study on the environment by experts had indicated that the river bed was of fine sand but was subsequently found to have loose silt upto a depth of 0.5 feet. There are several small drains carrying domestic sewage into the river bed. These were the focal points for the growth of water hyacinth. The weir had created lentic conditions (static water) but during the flood seasons when a strong current of 4 to 5 knots develops, the ecology turns lotic. The deeper serpentine channel of the original river bed with the

strong current was free from weeds during the study but the marginal shallow areas had intense growth within a period of two years of impoundment. Maximum depth of water at the weir site was 8m., but the depth of the channel upstream varied between 6 to 10 feet.

Variety and quantity of weeds: 80 percent of the submerged weed was *Hydrilla verticillata*. Propagation is both vegetative and from seed, the former being common. Other weeds were *Vallisneria spiralis*, *Potamogeton nodosus*, and *Potamogeton crispus*. Almost 90% of the floating weeds were *Eichornia crassipes*, the rest consisting of *Lemna* sp., *Azolla pinnata*, *Nymphoides cristatum*, *Paspalidium* sp., *Pithofora* sp., etc. Weeds were sampled at random in many localities covering the entire area and weights recorded in order to determine the volume. Average weight of submerged weeds was 7.6 kg per sq. m of submerged coverage as compared to 9.7 kg for a surface area of one sq m. A standard frame of bamboo of one sq. m with side projections was used in sampling. From the estimate of weights in a unit area and approximate estimate of waterspread, submerged weeds by weight were calculated. The total came to 63,000 tonnes, consisting of floating weeds 10,080 mt and submerged 52,920 mt.

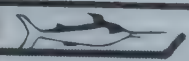
Estimated annual regeneration: There are no records available to indicate the annual accretion of weeds but in two years of impoundment the infestation weighed as much as 63,000 mt. The submerged weeds had already formed thick matrices while water hyacinth, clearly a new comer as evidenced by young plants, was seen to be slowly competing with the submerged weeds. In some places, where water hyacinth had been able to establish a surface colony there

were no submerged weeds. There was a natural facility in that when the water level reached 8 R.L. some water hyacinth could be floated down to perish in the tidal brackishwater downstream.

Consideration of established technologies available for control: It was decided as an *ad hoc* measure to attempt removing 20,000 mt. of weeds applying well known and established technology of use of 2.4.D for eradicating surface weeds. In actual practice, however, apart from the cost involved, the stems of water hyacinth settled down after the leaves had rotted. The rotten leaves, as they flow down, are liable to clog the automatic shutters. Mass scale use of 2.4.D was found inadvisable but the chemical could be sprayed on incoming and growing young plants as a preventive measure. Maximum benefit for removing the weeds can be taken when the floods are at 8 R.L. and above. At lower levels the weeds could be removed manually or by operating surface drag nets through use of power winches.

For removing submerged weeds, stocking of grass carp (*Ctenopharyngodon idella*) has been found to be an excellent tool, provided they are stocked when they are at juvenile size and when the weeds have not yet formed into thick mats. In the present case, a large number of grass carps of only fry size had been stocked but subsequent netting had shown that the fish failed to establish itself. In order to establish conditions for its survival, zones of thinned submerged weeds in comparatively calm areas as required have to be created and these have to be stocked with grass carp juveniles. This is however a long term solution but the immediate problem was one of checking spread weeds.

Use of portable power winches with different types of drag nets had been



taken up as a routine operation in the Kausalyaganga Fish farm in Puri District of Orissa since the sixties of the last century. Various types of drag nets had been evolved through research conducted over years, efficiency being determined on the parameters of quantities removed in an unit of time, number of rooted plants removed and the time taken for regeneration. Mooring of winches on the banks requires considerable skill to be developed out of various trials and practice. In this case, the winches of 8 HP with diesel power and 1800 steel cable of 5/8" was provided in the cable reel, and a Capstan of about one foot dia was mounted along side the cable drum which was mechanically driven. The winch was equipped with brake and clutch arrangements. Two metal swivel hooks, cargo hoisting snatch blocks of 8" outside dia and with sheave, thickness of rim 1/4" with steel sheave for operating 1/2"-5/8" diameter wire ropes were provided. Blocks had bronze side bearings and were self-lubricating. Wire rope was flexible hoisting type with strands of plow steel. Various types of drag nets with or without skids were operated from two winches, the type, size and design of the drag being adopted from different models depending on the type of weeds, thickness of mats, and the nature of the bottom grounds (with small boulders or plain depth of silt, condition of the bank and other relevant items). Weeding experiments with power covered a variety of weeds like *Pistia*, *Limnanthemum*, *Hydrilla*, lotus, lily, water hyacinth *Najas*, *otellia* and other floating and submerged weeds. Both small, medium and large water areas were covered. Generally there was an upsurge of phytoplankton after dewatering lasting for 10 to 20 days. In large areas spraying of small quantities of urea after thorough dewatering on the surface, caused a phytobloom to develop controlling further growth of submerged weeds.

Estimates of operational results and equipment required

From experience in Kausalyaganga two winches operated by skilled labour and with suitable sites for mooring the

winches could take out 7 to 8000 mt of weeds. In this case four winches working round the year could check further growth and maintain *status quo* of submerged weeds. However, eight numbers of units would be necessary for eradication of weeds over a period of 2 years. Training of labour for effective operations would require a period of atleast 5 months. In this case it was estimated that the cost of taking out one mt of weed would be Rs. 20 and tenders could be invited from contractors. Payment could be made by weight or better by sizing the weeds on the bank into geometrical units and paid by weight converted from unit volume. For floating weeds the cheapest way was to drag the weeds to the weir by power boats with nets and float over the weir as much of it as possible during high flood. But it would be extremely useful to provide central open shutters so that a particular R.L. can be avoided and a longer period made available for the floating weeds to go over the weir.

Suggested further research: Further work is indicated for simplifying the operation and also to enable mechanical dewatering in areas where sloping banks are not available for fixing the winches. Embedded concrete blocks set up at appropriate distances could be tried to serve the purpose. Double drum marine type winches could be used instead of two winches. These trawl winches are powerful and are equipped with clutch and brakes enabling differential operation of each drum. They can also be mounted on a boat and trawl type nets can be used to drive the floating weeds over the weir.

Discussion and Conclusions : Weed control and Management in large infested areas has not yet become possible in India on account of lack of realisation that every impoundment should have an inbuilt infrastructure in the planning stage to prevent regeneration of weeds from the beginning of impoundment. This would require nurseries and rearing tanks for grass carp, power spraying equipment for 2.4 D, winches and drag nets for year round operations. Since large projects once choked with weeds can only be cleared at enormous cost prevention is

essential. Unfortunately, this foresight is not in evidence to any desirable extent as yet. To save reservoirs from losing their capacity for water supply due to weeds and considering the vast extent of weeded wastewater areas which can be productive, commercial methods on a large scale have to be adopted. The experiments of the past indicate one such means has been found feasible in the field over three decades back. Orissa had developed this method and cleared such areas as Kausalyaganga, Ainsuppa lake (1960) and 20 other large and small areas and converted them into both demonstration as well as commercial fish farms. It is desirable that further research on mechanical dewatering is pursued by the Central Fisheries Research Institutes concerned. It is not attractive to contractors to take one project and spend a large sum on capital equipment but, if several areas are brought under contract system in a phased manner, contractors would be interested. Or, if maintenance contracts for management of weeds are given to contractors from the beginning for a few projects, private enterprises are likely to come into the picture. This aspect was brought out in several discussions with contractors while working on this project in an attempt to find a long term working solution to such problems, which are common to the whole country, particularly in the coastal areas and irrigation canals. ☺☺☺

Calling Fisheries Students !

An Exclusive Offer

Pay the full Annual Subscription (780/-) to FISHING CHIMES and get the book APPLIED FISH GENETICS costing Rs.600 free!

Send a D.D. for 780/- favouring Fishing Chimes, Visakhapatnam, and get both the journal (12 issues) and the Book

**Fishing Chimes, Sector 12,
Plot 176, M.V.P. Colony,
Visakhapatnam-17.**

Training Workshop on

Potential of Artificial Substrate - Based Microbial Film in Aquaculture

College of Fisheries, Mangalore : 15-16 Oct 2001

The captioned workshop, sponsored by UNESCO, was inaugurated by Dr. A.M.Krishnappa, Vice Chancellor, University of Agricultural Sciences, Bangalore, at 9.30 AM on 15 th Oct 2001. Dr.M.S.Alam, Director, UNESCO, New Delhi released the workshop manual. Dr.T.J.Varghese, former Director of the Fisheries College was the guest of honour. Dr.D.S.Sheshappa Director of Instruction presided over the function. Dr.K.M.Shankar, Co-ordinator of the workshop presented a detailed account

departments took part in the deliberations/discussions.

An interesting and thought provoking assessment, that more than 50% of the fish yield from a fertilised pond is contributed by food organisms less than 37 μ in size growing on particles, is the basis for the development of technology of substrate-based microbial biofilm for boosting fish production. The light independent heterotrophs grow and multiply round the clock at all depths and hence have great potential for boosting fish production.

Promotion of microbial biofilm on biodegradable plant substrate offers easily harvestable attached food organisms at high density to fish and fish food organisms. Studies conducted at the Department of Aquaculture, College of Fisheries, Mangalore, have

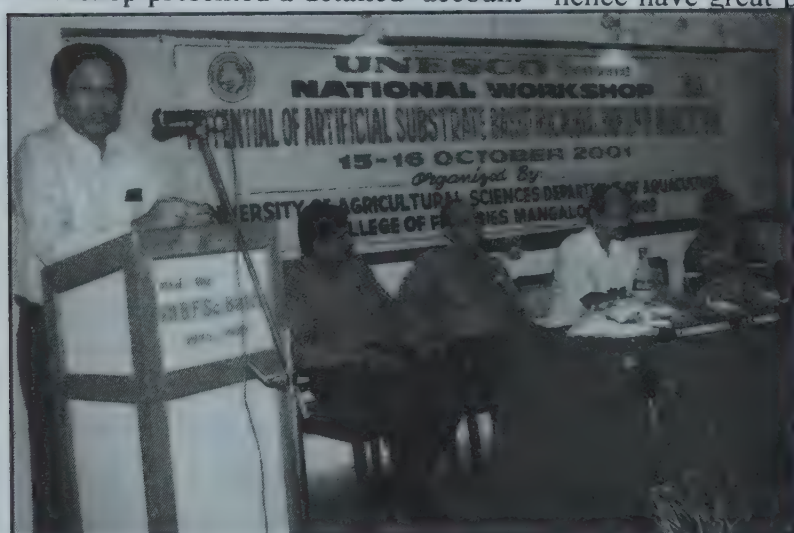
able aquaculture in developing countries where poor and marginal farmers constitute the majority. Scope for appropriate bioconversion of agricultural plant substrates is the added attraction of this technology.

The training programme covered various aspects of the technology of promotion of substrate-based microbial film for augmenting fish production, economics of adoption of this technology in the place of using including the expensive artificial feeds for growth of fish culture.

Ten lectures were delivered covering various aspects of the technology. A manual on the details of lectures was published. Experts from the Department and outside experts Dr. Wahab, Professor, Fisheries Faculty, Bangladesh Agriculture University, Mymensingh, Bangladesh and Dr. Bright Singh from the Cochin University of Science and Technology, Cochin delivered the lectures.

After the series of lectures and discussion on 15 th 16 th, the technology was demonstrated in the fish farm of the Department. This was followed by qualitative and quantitative analysis of microbial biofilm collected from substrates such as sugarcane bagasse and bamboo. Development of microbial biofilm oral vaccine on chitin substrate was also demonstrated.

The workshop came to a close on the evening of 16th Oct, 2001. Dr Sheshappa, Director of Instruction distributed workshop certificates to the participants.



A.M. Krishnappa, Vice-Chancellor, University of Agricultural Sciences, delivering inaugural address

of the development of the substrate based microbial biofilm technology and told about the assistance of UNESCO to disseminate the technology to the end users.

A total of 26 participants attended the training workshop. The participants were chosen from a broad spectrum covering teachers/scientists from various Fisheries Colleges/ Agriculture Universities, ICAR Fisheries institutions, administrators from fisheries departments of Karnataka and Andrapradesh and fish farming community of Karnataka. In addition a good number of post graduate students (20 nos) of the participating

clearly indicated that growth of carps can be boosted by 60-100% by promoting microbial biofilm on substrates and hence the technology can be a cheap alternative to feeding of fish /shellfish on expensive artificial feed. Besides, microbial biofilm works as *in situ* biofilter improving water quality by stripping ammonia accumulation. Microbial biofilm also helps in improving health status of fish by acting as oral vaccine with better antigen delivery eliciting improved immune response and protection. Overall, promotion of biofilm on substrates in a pond to boost fish/shelfish production can be an ideal technology for sustain-

Read Fishing Chimes
Your
Desktop companion

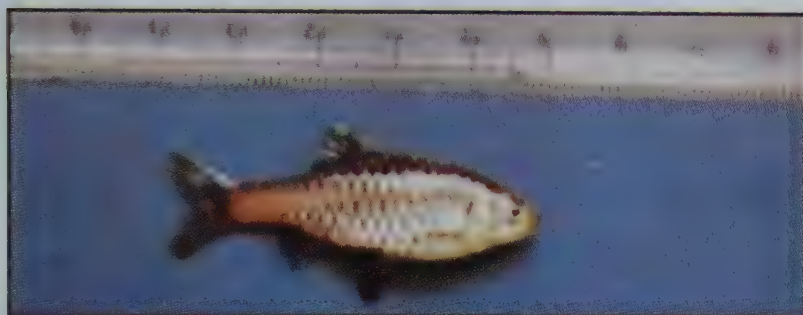
Colour changing *Puntius* species, a locally available ornamental fish of Meghalaya

R.N. Bhuyan and D. Sarma
Department of Pisciculture
St. Anthony's College, Shillong
Meghalaya-793001

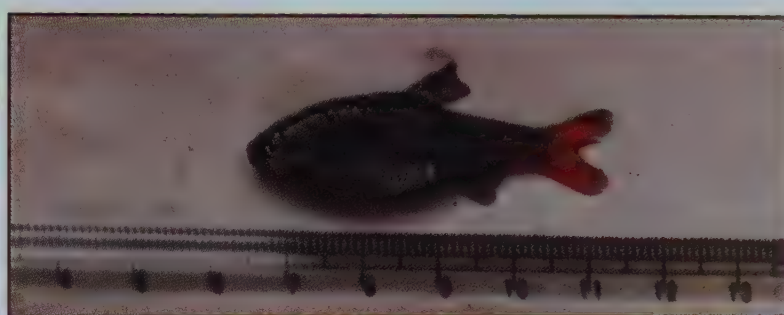
Little is known regarding locally available ornamental fishes of Meghalaya. The State has several species of ornamental fishes, dominated by several *Danio* spp, *Garra* spp, and loaches. During the survey of locally available ornamental fishes in and around the capital city Shillong, a colour changing *Puntius* species was observed in the different streams (sumer, Umroi) and paddy fields of Meghalaya, which is different from other *Puntius* species because of this colour changing behaviour. Kept in

back to the silvery white colouration often and on. In a day it changes its colour several times when it is kept in a glass aquarium at a constant temperature of 24-26°C. This shows that this colour changing behaviour is not directly related to the temperature. It was also observed that this colour changing phenomenon is not associated with the breeding season. The conjecture is that this particular capability is related to defence mechanisms related to factors such as stress, predator prey relationship etc. Studies

peduncle but with no mention of colour changing ability. Thus it appears that the colour changing phenomenon reported here is unique. Talwar and Jhingran (1991) said that *Puntius sophere*, which has a round blotch on caudal and dorsal fins, is similar to this species. In the *Puntius* species under report, instead of blotches, light black patches are present on middle of the dorsal fin and there is no mention of colour changing character of *Puntius sophere* in the available literature. Considering



Puntius spp : Silvery White in Colour



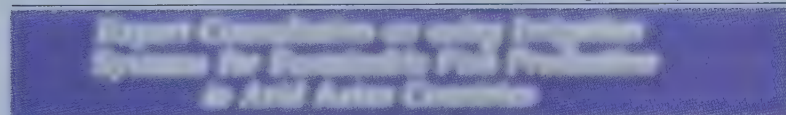
Puntius spp : Black with Red Caudal fin

an aquarium after collection from its natural habitat, the fish was observed to exhibit the same phenomenon. It changes its colour from silvery white to black with its caudal fin becoming red. It reverts

are in progress in this regard.

Day (1878) reported a similar species of *Puntius*, mentioned as *Barbus sophere*, from Khasia hills which is having a single black blotch on the caudal

this, it is felt that detailed studies are required not only in respect of this species but also for other ornamental fishes of Meghalaya, which have immense commercial potential. ☹☹☹



The FAO Expert Consultation (Ex Co) on the use of irrigation systems for sustainable fish production in Arid countries of Asia was held in Almaty, Kazakhstan during 25-29 September, 2001. The ExCo was attended by the representatives of China, India, Iran, Kazakhstan, Kirgizstan, Mongolia, Pakistan, Syrian Arab Republic, Turkey and Uzbekistan. The meeting was coordinated by Mr. Gerd Marmulla of Fisheries Resource Division, FAO, Rome and Dr. Tomislav Petr of Australia. Dr. P.V. Dehadrai, former Deputy Director General, Fisheries, ICAR and Mr. Bishnu P. Das, former Irrigation Adviser, Govt. of Orissa, represented India.

The meeting facilitated a close interaction on common problems, in the areas where fisheries interests in water resources have been in conflict with the demands from the irrigated agriculture sector.

Several countries of the region covered by the Ex Co utilise reservoirs, canals and terminal water bodies for fish production. Unilateral decisions to release water for irrigation and flood control from the reservoirs, lack of appreciation in regard to fishery requirements by the irrigation sector, necessity of recognizing multiuse of irrigation water resources, use of drainage/waste waters for fisheries, potentials of terminal water bodies for fisheries, stipulation of a definite overall water demand from the regional grid of water resources for fisheries,

trans-border coordinated management of river systems and the necessity of compatible Acts/Laws for sustainable fisheries resources management and their conservation in open water systems were some of the critical issues discussed in the meeting.

It was decided to constitute an FAO *ad hoc* Working Party to



Consultation in progress

address the critical issues as related to fisheries in irrigation systems in the countries of the region including India and to assist in the development of strategies for the rehabilitation of these fisheries and their further development.

The concern for poor coordination and monitoring of irrigation resources in the region was unanimously expressed in the meeting. ☹



NAN RONG

THE NAME OF TAIWANESE PADDLEWHEEL AERATOR



NR-A101 1HP Paddlewheel Aerator

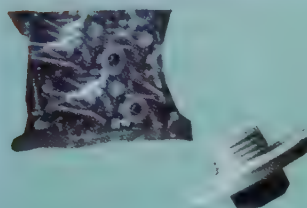
● Spare/Replacement Parts ●



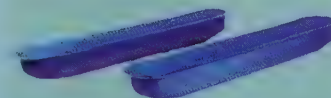
Bearing Cover &
Rubber Bushing



Bearing Stand



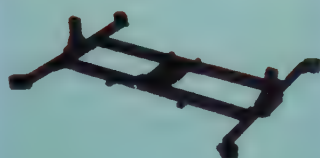
Screw Package &
Plastic Nut



PE Float



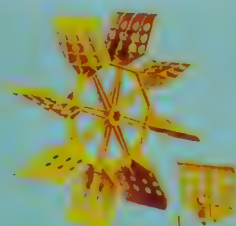
Plastic Shaft



Plastic Frame



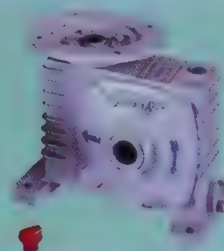
PE Cover



Plastic Impeller



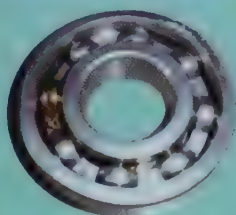
Motor



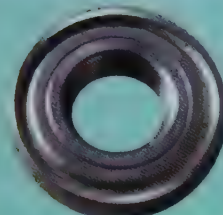
Reducer(14:1)



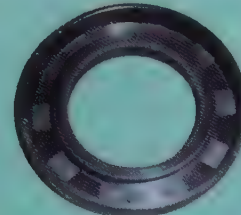
Motor fan



Reducer Bearing #6306



Reducer Bearing #6206



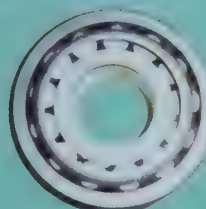
Oil Seal



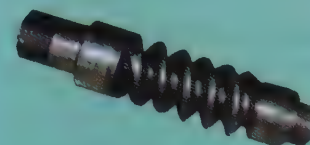
Output Shaft



Worm Gear Wheel (14:1)



Reducer Bearing #30305



Input Shaft (new 185mm)



Geekay Marines Private Limited

Registered office:

Q-2, 6th Avenue, Anna Nagar (W)

Chennai, 600040

TEL:+91 44 6223882, 6286159

FAX:+91 44 6207345

Email: gkmarine@satyam.net.in

Head office:

Geekay Marines Private Limited

16/1612, Bye Pass Road

Ramamurthy Nagar, Nellore 524 003

TEL: +91 861 335 901, 332 048

FAX: +91 861 335 901

Gudur: +91 8624 51137

Third World Aquaculture and the Environment

Kitto M., Regunathan C. and Babu M.

(About the Authors : Kitto is a Researcher from the Research centre of Department of Botany, Scott Christian College, Nagercoil, presently serving in the Gulf International Aquaculture Company, Kuwait. Regunathan is from Al Murjan Marine Resources Co.Ltd., Republic of Yemen. Babu is from the Institute for Coastal Area Studies, M.S. University, Nagercoil, India).

The earth's human population is at six billion today. For meeting the growing demands of 7.03 billion in 2010 and 8.5 billion in 2025, environmentally sustainable development must be an explicit goal. The matrix of modified developmental habitats and surrounding fragments profoundly influence the species composition and dynamics of the fragmented population.

Every human on earth is a resource manager. Agriculture, a principal wetland-dependent activity, has been developed in virtually all sustainable land areas such as, plains, terraces, mudflats, riparian zones, river deltas etc. Rice fields and shallow fishponds are technically wetlands with simple energy flows focussed on food production. How sound it would be if all paddy fields on the globe are utilised for culture of fish too? Out of 8 billion people, by the year 2020, 4.3 billion of them would be fish consumers.

Agri-aquacultural systems increase soil fertility to a greater extent and hence are highly efficient in food production with ample scope for development in the Third World. Even the world's annual rice production must rise from 600 million to 800 million tons to feed them. Aquaculture in its traditional pristine state can contribute quality fish in larger quantities for another 50 years if it is not in the intensive domain of the capitalists. A report produced for ministers for fisheries in connection with the twenty first session of the FAO Committee on Fisheries (COFI) in Rome in March 1995 had warned that, in order to keep world per caput consumption at its present

level over the next 15 years, aquaculture production must be doubled.

Third World Aquaculture : A Misled Phenomenon that needs Reform

Food production system, in order to be sustainable, needs to avoid environmental harm. 'Sustainable' means the judicious management of the natural resource wealth for food and commerce ensuring perpetual providence for the earth's flora and fauna. Assured contribution of agro-piscicultural system to food security is based on principles of nutrient recycling and efficient use of farmland and water resources with approximately low input production system towards the production of lower value herbivorous and/or omnivorous finfish and shellfish species feeding low on the aquatic food chain, and yielding diversified production, labour and income patterns.

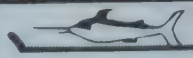
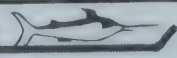
Wetland ecosystems consist of multiple linked components (waterways, habitat types, plants and animals) that exchange components through energy flow, chemical and physical transfers, moving biota and water flows. Wetlands are usually found at the interface between truly terrestrial ecosystems and truly aquatic ecosystems. Such ecotones are transition zones from uplands with species from both aquatic and terrestrial systems and distinctly the most biologically productive ecosystems on earth. As most coastal regions are generally the nursery grounds for most of the commercial sea fishes, the ecological importance of any coastal area should be considered before attempting usage for aquaculture or any other developmental activity. Export-oriented aquaculture development is much to the detriment of the protein needs of the local population.

The world-wide upsurge in aquaculture production today requires analysis of the role ecological footprints play in ensuring optimal realization of aquatic potentials, while evidencing equitable

use of the aquatic resource and its natural environment. Newer recognitions of selected species for cultivation in countries with little or no history of aquaculture truly explains the thrusting efficiency in aquaculture expansion purely on monetary returns in mind. Environment has to be utilized not just as the culture space but also as the producer of the food chain for the cultured fish. This trend naturally promotes a healthy relationship between the fish farmer and his pond's environmental ecology.

The anarchic development of aquaculture projects in Asia and Latin American countries has deprived many local communities of their means to earn their bread. Blue revolution has largely taken place in vast mangrove areas or in their vicinity near traditional paddy fields, which form the source of staple foods for the local population. Mangrove deaths can just be caused even by desolation of the regions from the adjoining systems by earthen embankments. Traditional harvests of marine wild fry for seasonal stocking yields incomes for the resource-poor farmers.

Barren and salty tracts have to be earmarked as intensive aquaculture grounds. The peripheral sphere with brackishwaters can be adapted for integrated farming. Adjoining freshwater pockets have to be exclusively demarcated and enlegislated for freshwater aquaculture as a whole. Interspaced freshwater ponds can not only provide water for paddy fields and garden plains but also to mini-plantations. The increased environmental load from aquaculture sites should however be made inaccessible to rural farming. Lack of adequate understanding of the strong relationships between the production system, the site selection procedure, the cultivated species, the size of the farm and the production management could create environmental problems for the rearing waters, the reared culture species and the major aquatic area as a whole. Aquaculture effluents need biological treat-



ments, productively exploiting the nutrients for seaweed, mussel and finfish culture. Growth of salt-tolerant plants like *Salicornia bigelowii*, which can be construed as waste, can scavenge the hyper-eutrophied effluent marshes and yield vegetable and oil. Brackishwater biotopes choked with weeds can be stocked with grass-eating Chinese grass carp or indigenous fishes like *Puntius pulchellus* to control the weed and also for improving the biotope for fish production through auto-stocking. Tiger shrimp culture in freshwater is another welcoming practice.

Semi-intensive freshwater aquaculture ponds are multi-oriented stores for water and for enhancing the productivity of surrounding waters and lands. Aquaculture in synergy with agriculture employing candidate species like mullets, carps, catfish etc., bringing integrations like rice-fish; livestock-poultry-fish; vegetable-fish; rice-freshwater prawn; rice-*Ipomoea aquatica* can harbour ample fingerlings for further grow-out in other ponds and inland lakes. Small ponds in Cambodia are able to produce 20-50 kg per 100 sq.mt. using the on-farm resources to meet atleast part of the family fish requirement. Most of the fittingly efficient systems are those which are able to couple or decouple rice and pond enterprises. Cow peas and French beans

can be sown in rows on the dykes of rice-fish culture system. Farmyard waste and poultry manure should have to be used optimally to obtain higher outputs. Overall advantages suggested are the synergistic effect of fish on rice; weeds and insect control by fish; increased efficiency of resource utilization; reduced investment risk through crop diversification and additional source of food and income; more attentive care resulting in better crop management; modest capital needs and year-round employment, and income and nutrition for the farm-family.

Recharging of defunct wells and springs, promotion of fishery in new and old reservoirs, polyculture of fishes in small shallow seasonal water bodies, culturing aquatic vegetation like *Nelumbium* (Lotus) for greens and rhizomes, and growing of semi-aquatic greens on dykes of paddy fields can build up a stage for maximum level of utilisation of inland natural resources. Rivers serve as sediment-setting basins too.

Preservation of bio-diversity with exploitation-cum-nurture approach has to proceed from local grassroots level upwards instead of being thrust from above. Environmental degradation is not a problem of the relationship between people and their habitats but one of a relationship between competitors for ac-

cess to the productive resources. Traditional subsistence also has undergone substantial change, of late, as a result of growing commercialization. Rural development projects often present packaged technologies to clients, an exercise to provide subsistence without assessing their true applicability to the socio-economic structure of the recipient community.

Aquaculture has to be identified as a supplementary means of livelihood for rural women in the Third World. Present seaweed production comes from natural grounds but there is an indication that the supply is far decreasing while the demand is tending to increase. Usage of seaweeds for food in China, Japan, Korea, the Philippines and some Pacific island countries set an example for the food-starved countries. Aquaculture has to be a tool rather than an adversity to a wholesome environment. Aqua-ranching which is mainly the enhancement of fish stock through managed production and stocking of seeds in natural areas can further close the gap between captured and cultured resources.

The ultimate challenge today is on working out strategies that balance the need to address hunger and poverty and the sustainable use of natural resources and ecosystems. ☺☺☺

Positive Signals: Mech Boats diesel excise exemption

The Finance Minister, Mr. Yashwant Sinha, and the Minister for Agriculture, Mr. Ajit Singh, are reported to have agreed to consider the demand of mechanised fishing boat operators for full excise duty exemption on diesel supplied to them.

An assurance to this effect, according to an official press release, was given to the Minister for Petroleum and Natural Gas, Mr. Ram Naik, who called on both the Union Ministers along with Mr Chintaman Wanaga, member of Parliament from Dahanu in Thane district and a delegation of fishermen's

organisations.

Mr. Naik said that from 1968 to 1988, fishermen were getting a 50 per cent excise duty concession on diesel. In 1990, in response to a demand raised by him in the Lok Sabha, the then Finance Minister, Prof Madhu Dandavate, had announced the Government would reimburse in full excise duty payable on the diesel used by small mechanised fishing boats.

Accordingly, a scheme under the Department of Animal Husbandry & Dairying was subsequently formulated for 100 per cent reimbursement of excise

duty.

At the meetings with the ministers. Mr Naik informed them that while excise duty currently levied on diesel is Rs.2.52 per litre, the actual reimbursement to fishermen continued to be at 35 paise per litre which was the total excise amount levied on diesel at the time of the formulation of the scheme in 1990.

Requests have, therefore, been made to both the Ministers to reimburse excise duty at the current rate of Rs.2.52 per litre. Reimbursement of the excise amount, it has been requested, should be initially implemented in three States, namely, Maharashtra, Gujarat and Karnataka, where co-operative societies of fishermen are functioning and these States have exempted diesel sold to fishermen from the levy of sales tax. ☺☺☺

Fisheries Research Needs of North-East India: Regional Consultation

A regional consultation on research needs for fisheries development in the northeast was organised by Central Inland Capture Fisheries Research Institute on 6 & 7 November, 2001 with the following objectives:

- * To identify the areas requiring research support.
- * Immediate and long term measures to increase fish yield.
- * To identify the training requirements both on current and long term basis.
- * To assess extension and scientific manpower development needs of the region.

The primary aim of the Consultation was to bring together the key persons involved in decision making at the state and fisheries institute's level on fisheries development of the region, to deliberate on the following in particular.

- To provide a forum for exchange of views among themselves.

- To prioritize the possibilities of maintaining a continued dialogue and exchange of information among researchers, planners and managers.

- To review the current status of fisheries management in the region.

The response to the Consultation was overwhelming with key persons representing the states of Assam, Arunachal Pradesh, Manipur, Mizoram and Nagaland. There was good participation of ICAR institutes of the region, i.e., CIFT, Cochin, CIFA, Bhubaneswar; NBFGR, Lucknow and CICFRI.

The Consultation was inaugurated by Dr. S.A.H. Abidi, Member, ASRB. While speaking on the occasion Abidi

told the distinguished delegates to streamline the research and development efforts for optimum utilization of the fisheries resources of the northeastern region. He felt that the reasons for not harnessing the fish production potential of the region adequately were mainly lack of infrastructure, inadequate man-power development, dearth of critical inputs like quality fish seed and feed, and low temperature regime. Concentrated efforts of all agencies the centre and the states are needed to achieve the cherished goal of making the northeast self sufficient in fish production. He lauded the efforts of

tions of Dr. Abidi towards promotion of fisheries research and development. He added that Dr. Abidi with his wide experience in fisheries research and development in India was indeed the right person to give direction to this Consultation in its deliberation.

Dr. Abidi was felicitated on behalf of the Consultation for his signal achievements in the field of fisheries research and education.

TECHNICAL SESSION

The technical session commenced with a presentation by Dr. V.V. Sugunan,

Director, CICFRI reviewing the fisheries scenario of the northeast. He depicted the resource size, fish production potential and present utilization level in respect of the seven northeastern states. He also delved deep into the constraints and problems that came in the way of fisheries development of the region.

Presentation of status reports

1. Dr. K.K. Chaudhury, Di-

rector, Arunachal Pradesh elaborated on the fishery status in Arunachal Pradesh.

2. Mr. Sarat Chandra Singh, Additional Director, Fisheries, Manipur, presented the fishery status of Manipur.

3. Mr. C.M. Chang, Secretary, (Fisheries), Nagaland presented a paper on fisheries status of Nagaland.

4. Mr. S. Barua, Director of Fisheries, Assam, presented his report on fishery status in Assam.

Presentation of Status Reports of the Region by ICAR Institutes

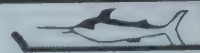
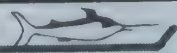
Dr. V. Vijayan, Principal Scientist, presented the report on the activities by CIFT



Consultation in Progress

CICFRI in bringing together a galaxy of fishery personnel of importance in this region and scientists from various ICAR Institutes to this Consultation. He was confident that the deliberations would bring forth a set of recommendations which will form the basis for future research and development in the region. He wished the Consultation all success in its efforts.

Dr. V.V. Sugunan, Director, CICFRI welcomed Dr. S.A.H. Abidi, and the delegates from different states and the ICAR institutes. He expressed his happiness that Dr. S.A.H. Abidi was in their midst to inaugurate this important Consultation. Dr. Sugunan referred the contribu-



in the region and responded to specific questions put by the participants. Dr. P.C. Mahanta, Principal Scientist, gave an account of the research and training activities of NBFGR, Lucknow in the region. Dr. P.P. Chakraborty, Senior Scientist, reported on the research and demonstration activities undertaken by CIFA. Dr. V.V. Sugunan, presented the activities of CICFRI for fisheries development and coordination.

Finally, after extensive deliberations, the following draft recommendations were formulated

1. The Consultation recommends to all state governments to formulate legislative measures to transfer fisheries management rights of water bodies to the fisheries departments.

2. CICFRI will act as nodal agency for training needs for northeastern states.

3. Director, CICFRI will approach NEC to provide fund for training personnel of northeast

4. All the state governments will collect resource-wise fish catch statistics. CICFRI would provide the necessary

technical support in the collection of such data.

5. CICFRI will take up research project to survey Rangandi reservoir of Arunachal Pradesh and Doyand reservoir in Nagaland.

6. CICFRI will provide all technical assistance to the state governments to undertake pen culture.

7. CICFRI will arrange need-based training programmes to the fisheries officials of state governments of the region.

8. Need is felt for on-farm research for refinement of technology for paddy-cum-fish culture in hill ecosystem. This will be taken up by CIFA.

9. Oil cake is not readily available in northeast. States of the region have therefore expressed the need for a suitable substitute for this for the preparation of fish feed. CIFA and CICFRI may take up research on formulation of fish feed using locally available materials.

10. CICFRI will take up study on economics of fisheries of Assam.

11. There are a large number of plants, fruits and roots having piscicidal value.

These may be screened for developing effective fish toxicants. CICFRI and CIFT will undertake the studies.

12. CIFT will take samples of dry fish to assess the quality and work on the process of dry fish preservation. The Institute shall provide technology of hygienic drying of fish.

13. Technology of mechanical means of weed clearance shall be made available to the States of the region by CIFT.

14. CIFT will disseminate the know how in respect of harvest technology among the States of the region.

15. There should be a mass awareness campaign on the need for conservation, adoption of rational fishing practices and prevention of indiscriminate introduction of exotic fishes. CICFRI and NBFGR will initiate a drive by providing literature, posters, media campaign, film show etc to the states of region.

16. CICFRI will provide norms for stocking of beels and reservoirs on specific requests made by the state governments of the region. ☹☹☹

Asean Event Signals Prosperous Future for Fishing Industry

The recently concluded "ASEAN-SEAFDEC Millennium Fisheries Conference and Exhibition" held in Bangkok from November 20 to 24, 2001 cast a bright new light on prospects of fisheries development in the region. This important event showed very clearly that the ten ASEAN countries (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam) are united in their intention to properly and rigourously manage their fisheries for the future. The conference and exhibition were strongly supported by the Japanese Government.

The associated exhibition equally clearly showed that the Asian Industry is intending to modernise massively over the foreseeable future.

Almost 2,400 people from throughout the region and further afield attended the exhibition which comprised 100 stands with exhibits from all ASEAN countries and more than 30 others as well. The main ASEAN SEAFDEC conference attracted some 800 delegates and the Asian Fisheries Federation Conference of fishing boat owners and operators attracted an additional 100.

Exhibition Organiser Michael Orr said: "There was an intensely positive attitude prevailing from almost every exhibitor, with most reporting making excellent contacts and even some direct sales during the exhibition. It is quite obvious that the ASEAN region is about to take off in terms of fisheries development."

The organisers of the exhibition, Baird

Publications, have decided that, following the success of the ASEAN-SEAFDEC event, they will be holding a similar event annually, the next one to be held in Bangkok in late January to early February, 2003. That event will be called "Asian Fisheries and Aquaculture" and will cover all aspects of sea and inland fisheries and sea, brackish and inland aquaculture as well as the processing, handling, storage and transport of seafood products.

For further information please contact:

Michael Orr or Jodie Ramage, Baird Publications, 135 Sturt Street, Southbank, Victoria 3006, Australia. or

Craig Moyes, Baird Publications, 193 Fleet Street, London EC4A 2AH, United Kingdom, Ph: +61 3 9645 0411, Ph: +44 20 7405 5829, Fax: +61 3 9645 0475, Fax: +44 20 7405 5872, E-mail: marinfo@baird.com.au, E-mail: marinfo@baird.co.uk, Web: www.baird.com.au ☹☹☹

Training programme on

'Breeding and Culture of Catfishes of India'

Agartala : 25-26 April 2001

The Central Institute of Fisheries Education (Deemed University), ICAR, Kolkata Centre, organized a short term training programme at Agartala (Tripura) on 'Breeding and culture of catfishes of India' as a prelude to the development of catfish fisheries in the North Eastern States, on 25 and 26 April 2001, in association with the Department of Fisheries, Government of Tripura, Agartala. In this training programme, 40 progressive fish farmers and 20 fishery officials of Tripura State had participated.

The training programme was inaugurated on 25.4.2001, presided by

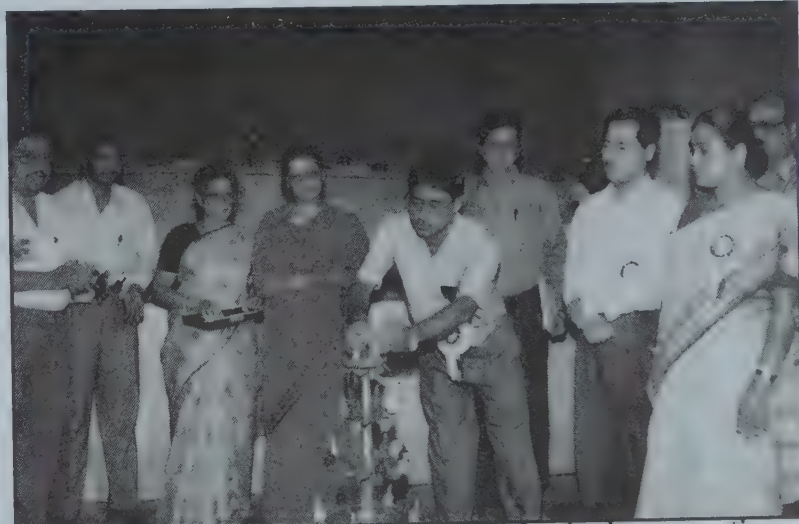
Ms. Jharna Das, Member of West Tripura Zilla Parishad. Mr. Sukumar Barman, Minister of Fisheries and Transport, Govt. of Tripura and Mr. Jeetendra Choudhury, Minister of Science, Technology and Environment, Govt. of Tripura were among the distinguished dignitaries who adorned the dais as Chief Guest and Guest of Honour respectively. Among the other dignitaries were Dr. S. Ayyappan, Director, CIFE, Mumbai; Mr. S.K. Sarkar, Director of Fisheries, Tripura; Mr. Tapan Chakraborty, Vice-Chairman, Tripura State Planning Board; Dr. R.C. Das, Principal Scientist and Of-

ficer-in-Charge of CIFE, Kolkata Centre and Dr. M.L. Bhowmick, Principal Scientist and Officer-in-Charge of CIFA, Kalyani Centre.

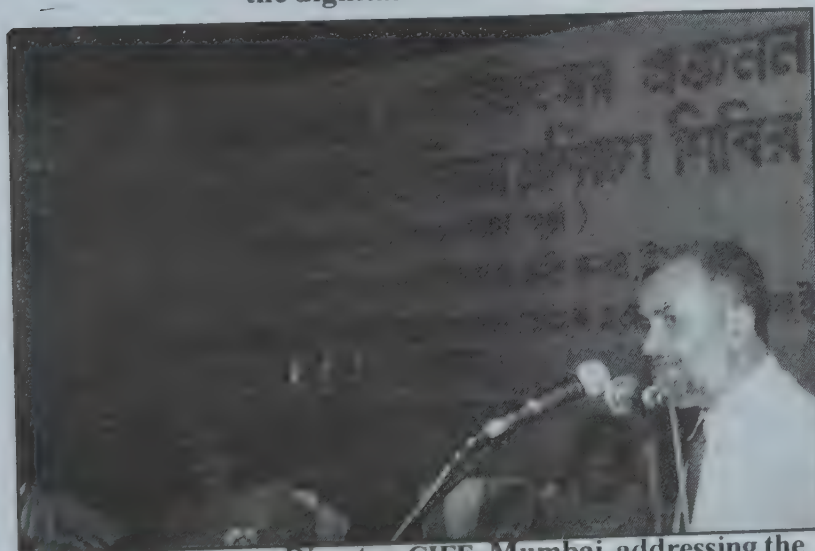
Mr. P.K. Chakraborty, Deputy Director of Fisheries, Tripura welcomed the dignitaries and the delegates. Dr. S. Ayyappan in his address emphasized the need for research inputs and extension efforts in the development of catfish farming in Tripura State. He added that this was the emerging demand of the local fish farmers. He promised that his Institute would extend needed facilities, and technical know-how and would



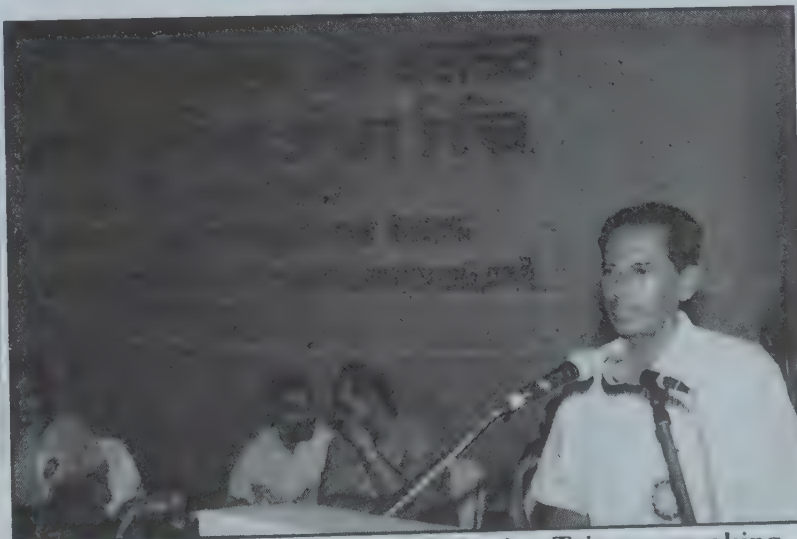
The inauguration ceremony of the training programme with the dignitaries on the dais



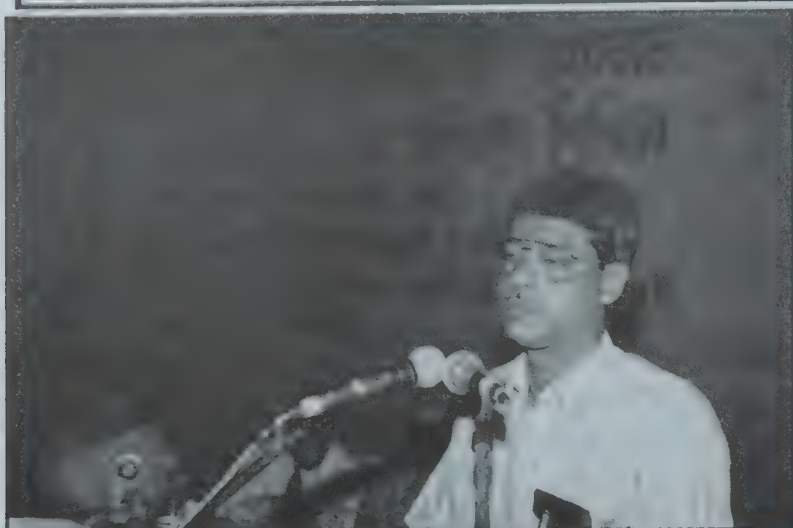
Mr. Sukumar Barman, Minister of Fisheries inaugurating the programme



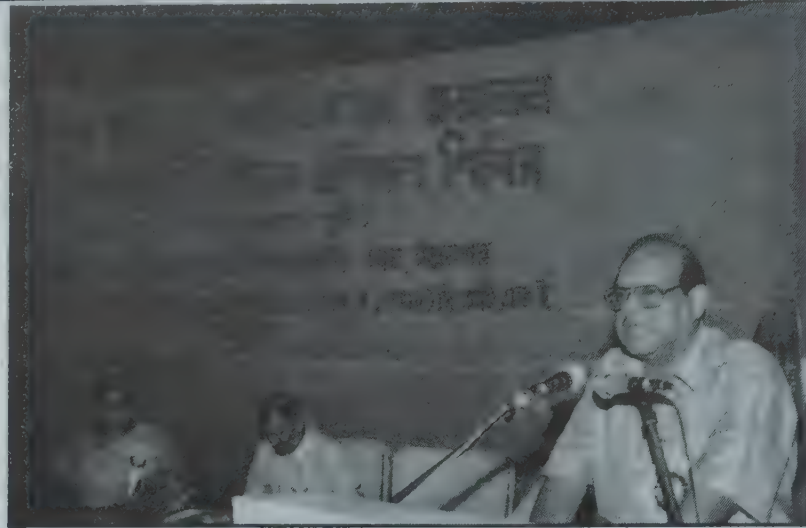
Dr. S. Ayyappan, Director, CIFE, Mumbai, addressing the audience and participants on freshwater aquaculture in India



Mr. S.K. Sarkar, Director of Fisheries, Tripura speaking on the occasion



**Mr. S.K. Sukumar Barman, Minister of Fisheries
addressing the gathering**



Dr. R.C. Das proposing the vote of thanks

also help in the implementation various programmes for Fisheries Development in the State.

Mr. S. K. Sarkar highlighted the importance of catfish culture in his State and emphasised the need for boosting up the culture activities by producing quality seed of catfishes. Mr. Tapan Chakraborty assured the farmers that the Tripura State Planning Board would come forward to support various projects aimed at the development of catfish culture and farming in the State. Dr. M. L. Bhowmick emphasized that among the catfishes, pabda (*Ompok pabda*) is the favourite fish of the natives of Tripura and its breeding and culture is possible since the technology has already been developed and the fish farmers can easily adopt the technology.

Mr. Sukumar Barman, Minister of Fisheries, profusely appreciated the efforts made by CIFE for educating the farmers and technical officials of the Fishery Department in the aspects of catfish breeding and culture. He remarked that his State was full of catfishes once upon a time but presently they had almost vanished from the State for the reason that no attention was bestowed towards sustainability of catfishes in this area. He urged that Government of India and ICAR should devote greater attention for the Development of Fisheries in the north-eastern region.

Mr. Jeetendra Choudhury, Minister of Science, Technology and Environment, Government of Tripura spoke on

the role of Science and Technology in the development of fish culture and development of technologies relating to it, keeping in view the environmental protection during the application of technology for the development. He added that his Department was supporting various programmes towards training and development of aquaculture in the State.

Dr. R.C. Das, in his presentation, emphasized the need for such training programmes in north eastern States in order to educate fish farmers as well as fishery officials for implementing programmes of development of aquaculture in the State. He promised that he would continue to support fish culture activities in the region by way of organizing various need-based training programmes. Dr. Das also proposed a vote of thanks to all the dignitaries, delegates, guests, media and all others who participated in the function and made it successful.

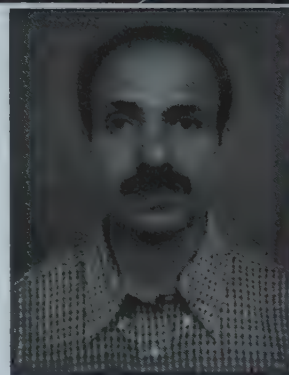
There were technical sessions, aimed at training of the farmers, held on 25 and on 26 April. The faculty who participated in the session that covered various aspects of breeding and culture of catfishes were: Dr. M.L.Bhowmick, Dr.R.C.Das, Dr.Archana Sinha, and Messers. P.K. Roy and P.S.Pandey belonging to CIFE, Kolkata Centre. The training imparted on the aspects of breeding and culture, nutritional requirements and various diseases that occurred during the culture phase and treatment measures in respect of important catfishes (pabda, magur and

singhi) were discussed.

The last session was devoted for interaction between the trainees and the trainers. The problems faced by the farmers were discussed in detail and solutions were proposed by the scientists/faculty members of CIFE, Kolkata centre. This session was followed by a valedictory function.



Award to K.V.Rajendran



K.V. Rajendran

A prize for the best poster presentation at the 10th International Conference of the European Association of Fish Pathologists "Diseases of Fish and Shellfish" for his poster "Structural protein and western blot analysis of two isolates of white spot syndrome virus (WSSV)" (Authors: Rajendran, K.V., Jung, S.J. and Oh, M.J.) was awarded to Dr. K.V. Rajendran Senior Scientist, Central Institute of Fisheries Education (CIFE) Versova, Andheri (W), Mumbai-400061. The prize was given at the meeting of the Conference held at Trinity College, During from 9-14 September, 2001.



NORTH -EASTERN REGIONAL CENTRE OF CICFRI INAUGURATED

At Dispur, Guwahati: 6th November 2001

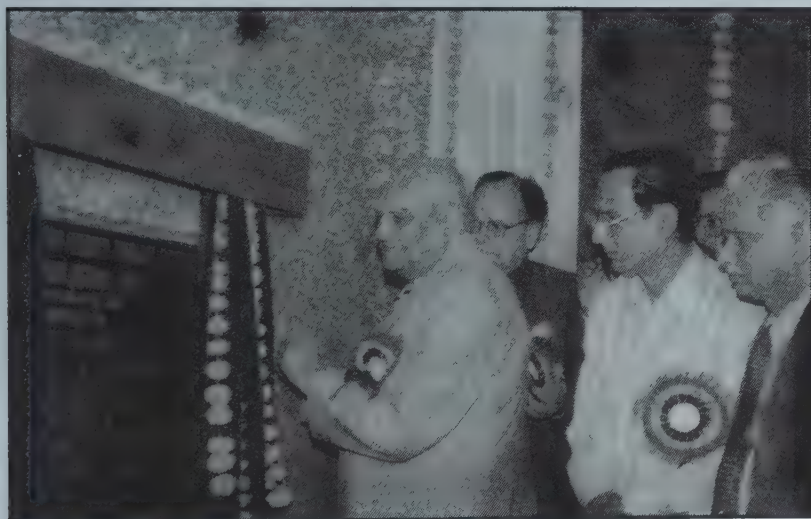
The new laboratory and office complex of the Northeastern Regional Centre of Central Inland Capture Fisheries Research Institute at Guwahati was inaugurated by Gen.(Retd) S.K. Sinha, Governor of Assam at a function held at the HOUSEFED Complex, Dispur on 6 November, 2001. Speaking on the occasion, the governor expressed his happiness that CICFRI was making all efforts to provide fisheries research, extension and training support to the northeastern region. He said that the region presented a picture of poverty amidst plenty, adding that this land of immense beauty some-

ponds and mini-barrages, lowlying paddy fields, and reservoirs needed organised developmental effort. The people of the northeast had very high preference for animal protein in general and fish in particular, he observed. Thus the wealth of proteinacious aquatic resources the state possessed and the prevailing high demand and lucrative price fish fetched in the region offered a congenial environment for fisheries development, he said. He exhorted the distinguished gathering of fishery scientists, administrators and academicians to work in unison to accomplish the task of increasing fish pro-

duction from the northeast.

The governor expressed satisfaction that CICFRI had been making enduring and all-round efforts to fulfill the research and training needs of the region and opined that the creation of the state-of-the-art laboratory facilities here would definitely help this institute in performing its task with an improved impact. He urged all concerned with fisheries development in the northeast to make full use of the expertise available at CICFRI.

Welcome Address : Earlier, Dr. V. V. Sugunan, Director, CICFRI extended a



His Excellency, Governor of Assam unveiling the commemorative plaque



Md Nazibul Umar, Hon. Minister of State for Fisheries, Government of Assam, cutting the ribbon to inaugurate laboratory block

how did not keep pace with the progress made by the rest of the country in terms of infrastructure building, industrialization, agricultural development, etc. In this context, he expressed the view that, agricultural development including fisheries has to play a pivotal role in the socio-economic development of the region. It was also emphasized by him that the vast and varied fishery resources of the north-eastern region in the form of rivers, floodplain wetlands, lakes,



Dignitaries at the dias

warm welcome to the governor, Lt. Gen. (Retd.) S.K. Sinha, the minister of state for fisheries, Assam, Md. Nazibul Umar, Dr. S.A.H. Abidi, member, Agricultural Scientist Recruitment Board, Dr. K. Gopakumar, Deputy Director General (Fisheries), ICAR, Mr. M.K. Barua, Secretary and Commissioner of Fisheries, Assam, and all other dignitaries. He observed that the presence of such luminaries indicated their keen interest in

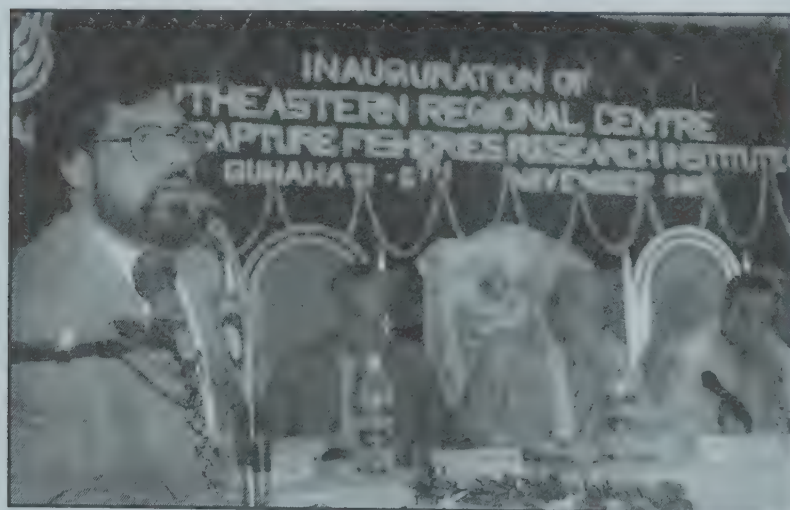
the development of fisheries of Assam. Recalling his earlier association with Lt.Gen.S.K.Sinha, Sugunan said that he always took keen interest in agriculture and allied activities. He was very keen to see that Assam and the northeast became self sufficient in fish production. This was the main reason the governor was here in spite of his busy schedule, he pointed out. He highlighted the role played by CICFRI in increasing inland fish production 14-fold during the last five decades. While saying that India was the second largest inland fish producer in the world, Sugunan sounded a note of caution at the same time that there was no room for complacency. Highlighting that several regions in the country were lagging behind in fish production

states of the region to set up different research institutes for finding solutions to their problems. Sugunan extended a warm welcome to Secretaries, Directors and other Senior Officials of the states of the region and of the Central Government present on the occasion.

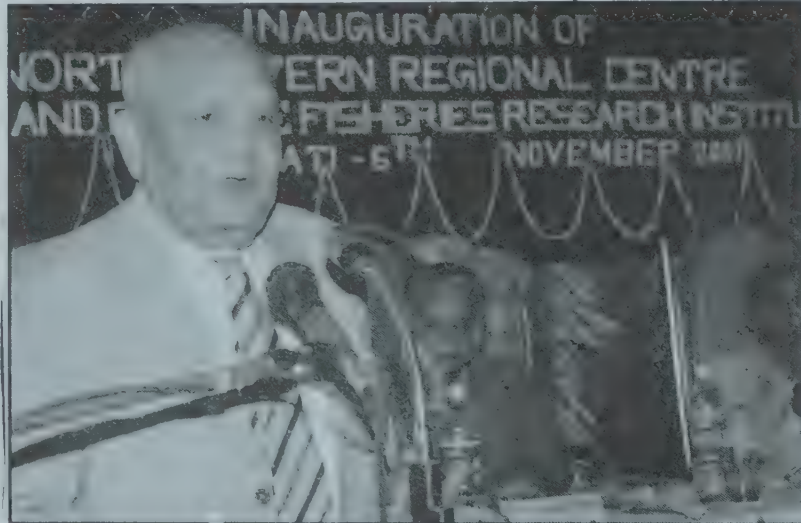
Presidential Address

Improve Fish Yields from Beels : Md. Naxibul Umar, the Minister of State for Fisheries, Government of Assam, in his presidential address laid focus on the fact that the beels and ponds in Assam were the main potential source of increasing fish production from the State. He regretted that the northeast of the country, the land of enviable aquatic resources, today could not meet its own require-

largest beel area in the country, only a small fraction of this important resource had been developed for fish production on scientific lines.. He laid emphasis on the urgent need to develop all such water bodies for increasing fish production in order to fill the gap between demand and supply. He articulated the fact that Assam was in need of modern techniques to improve fish yields from its beels, ponds and other types of water resources to fulfill the research and training needs of the region. He complimented ICAR for the creation of modern laboratory facilities at this complex which was a right step to meet this need. He urged the State Fisheries Department and the Assam Fisheries Development Corporation to derive utmost advantage from this cen-



Dr. V.V. Sugunan, Director CICFRI, delivering the welcome address



Gen. (Retd) S.K. Sinha, delivering the inaugural address

and northeast was one such region, he said that CICFRI had been paying attention to these regions with special attention to the northeast, because of the higher potential of the region. While narrating CICFRI's plan to take up extensive research, extension and training programmes in the region, Sugunan disclosed that there was a scheme to establish NEFTEC (Northeastern Fisheries Training and Extension Centre) at Guwahati as a Tenth



The audience

Plan activity. Mentioning that this would provide a single window solution to all research, training and extension requirements of the region, he said that such a centre would obviate the need for the

ments for fish. Even though Assam accounted for more than half of the fish produced in the northeast at present, only 39% of its requirements were met. He mentioned that, while Assam had the

tre to enhance fish yield from their water bodies. He congratulated the ICAR and CICFRI for setting up this most modern laboratory facility at Guwahati. He hoped that the Centre would grow from strength to strength to usher in rural prosperity through fisheries development in the region.

CICFRI's Pioneering Role in the North -East: Dr. S.A.H.Abidi, Member, ASRB

highlighted the efforts being made by CICFRI in improving fish production of the NE region. Expressing immense pleasure at participating in the inaugural ceremony of the Centre, he expressed confi-

dence that the emphasis given by ICAR in developing this Regional Centre will boost fisheries research and development in the northeast.

Pointing out that there were some constraints for fisheries development in the NE region viz., non availability of quality fish seed, low temperature regime, acidic soil, inadequate facilities for rearing fish seed into fingerlings and shortage of some critical inputs like fish feed coupled with post harvest infrastructure including marketing, he expressed optimism that, considering the varied potential resources and above all the love for fish entertained by the people of this region, fish production of the zone would surely increase. He pointed out that the Agricultural Scientists' Recruitment Board had always given preference for personnel working in the northeastern region in the selection of candidates for scientific positions. He was confident that the new centre created by CICFRI would provide a platform for scientists and fish farmers to interact in a manner that would lead to higher fish production in the northeastern region. He congratulated Dr. Sugunan, and his team of scientists for creating this centre with the

state-of-the-art facilities for fisheries research and development.

Regional Centre to cater to R & D Needs of NE: Dr.K.Gopakumar, Deputy Director-General (Fisheries), Indian Council of Agricultural Research had explained the special efforts made by the Fisheries Division of ICAR in providing R & D backup in the NE region. He said that ICAR had allocated sufficient funds for fisheries development in this region. The development of this regional centre at a cost Rs.2.5 crores bore testimony to the earnestness of ICAR. He narrated the efforts made by the Division to make CICFRI's dream a reality. Gopakumar was confident that this centre would evolve into one of the finest centres for fisheries research and development not only in Assam but also for the entire northeast. He complimented the Director, Dr. V.V.Sugunan and his dedicated band of colleagues for the successful development of this centre in the service of the northeastern region.

Future Strategy of CICFRI for fisheries development of NE region : Concluding, Gopakumar said that the northeastern region of the country has enormous untapped fish production potential. It

has vast natural wealth, enormous industrial potential, ideal natural agronomic conditions and a predominantly agrarian society. The production potential of the region has been estimated to be about 330,000 t against the present production of about 214,000 t. One of the reasons attributed to the large gap between the potential and actual production was the lack of manpower development activities in the region. In order to fill this gap CICFRI proposed to create a well oiled extension and training machinery in the region styled as North Eastern Fisheries Training and Extension Centre (NEFTEC). The proposed NEFTEC will have modern, state-of-the-art classrooms, audio-visual aids, hostels and guest room facilities. This new activity would be part of the work of the North-eastern Regional Centre of the Institute. It is envisaged that guest faculty from all the eight Institutes under the fisheries division of ICAR will be drafted for the training needs. Thus, the NEFTEC will provide a single window solution to the needs of northeastern states.

Exhibition: An exhibition depicting the achievements of CICFRI through film shows and posters was organised for the occasion. 

Hussainsagar fish turn poisonous

Once upon a time, not very long ago, Hussainsagar lake used to be a source of drinking water for the city of Hyderabad. Now, the pollution in the lake raises a stink that reaches far and wide. If one thought Hussainsagar is just foul smell and dirty water, he would be wrong. Even the lake sediment has reached poisonous levels due to pollution.

A study by Kakatiya University zoology professor Vikram Reddy and his student Vijay Kumar, have unravelled the dangerous levels of pollution in the lake sediment. "The pollution level is many times higher than ICMR and WHO standards. Sooner or later this will have a dangerous fallout on humans," observed Vijay Kumar highlighting the findings in his paper. The study involved an exhaus-

tive comparison between the pollution in the lake water and the sediment.

Arsenic, which was used to poison Napoleon Bonaparte, is 22.5 times higher than the WHO standards. Lead which accumulates in the body causing lead poisoning is 43.9 times higher than its acceptable level in water.

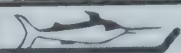
Mercury, one of the most dangerous heavy metals which proved to be a killer at Minimata Bay in Japan was found to be 689 times higher in the lake waters than acceptable WHO standards for drinking water.

The research methodology followed involved collection of samples from various zones of the sprawling lake. Their analysis had shown that the sewage

inflow near Necklace road was the most polluting of the lake water sources.

Though there might be an argument that WHO standards are unreliable as the lake is not a drinking water source, Vijay Kumar points out that the fish caught in the lake may prove dangerous as they are consumed by the people.

"These dangerous metals get accumulated in the bodies of benthic micro-invertebrates which thrive in the sediment and are part of the diet of smaller fishes. These poisoned fishes are eaten by humans. One can imagine the consequences of human consumption of these fishes with high accumulation of these dangerous metals," Vijay Kumar pointed out. 



International Workshop on

Aquaculture and Environment

Cochin, July 13th and 14th, 2001

Venue: International Hotel, Cochin

The initial successes and profits that coastal aquaculture development in the country yielded led to an unscientific and unplanned proliferation of shrimp farms with least concern towards the negative impacts. The shrimp farming community realized this serious set back which took place in the initial phase of coastal aquaculture development itself and the situation called for a scientifically planned and sustainable ecofriendly aquaculture development. Environmental impacts are often linked to major outbreak of shrimp diseases, production losses, degradation of natural resources and conflicting interests among coastal resource users. There have been issues like salinisation of soil and the consequential devaluation of lands, large scale abstraction of freshwater causing degradation of potable and agricultural water supplies, discharge of farm effluents and mangrove deforestation. Besides, the coastal aquaculture developments have been taking place in an isolated and uncoordinated manner, by and large, as an entrepreneurial endeavour.

A two-day international workshop on Aquaculture and Environment was jointly organised by the Centre for Integrated Management of Coastal Zones, School of Marine Sciences, Cochin University of Science and Technology University, India, Technical University, Delft, and Wageningen Agricultural University, The Netherlands.

The workshop was held at International Hotel, Cochin on 13 and 14 July, 2001. The main objective of the workshop was to discuss ways and means for a sustainable development of the coastal aquaculture in the country.

There were deliberations on harmonious integration of coastal zone management plans comprising various economic and conservation activities like ag-

riculture, forestry, mangrove, estuarine and lagoon fisheries, industry, habitation, tourism, etc. Over 100 delegates from India and abroad comprising scientists, administrators, academicians, progressive farmers, policy makers, representatives from industries, etc. attended the workshop and participated in the discussions.

There were 15 presentations on various focal themes related to sustainable development of shrimp farming in India such as status of coastal aquaculture, management of coastal shrimp farming, social conflicts and legal issues etc. Under the status of coastal aquaculture and economics of various shrimp production systems there were three presentations, while under integration of shrimp/prawn farming with other crops there were four presentations, dealing with case studies on shrimp-mangrove integration, shrimp-paddy integration, Giant freshwater prawn-rice integration and Molluscs-shrimp integration, based on the work carried out in different countries. There were four other presentations on environmental impacts on shrimp aquaculture and its management, while, as part of social conflicts confronting coastal aquaculture, issues like legislation and policy requirements, changing patterns of soil and water conditions due to shrimp farming and shrimp diseases, etiology and preventive measures etc were presented and discussed.

Session I: Inaugural

The dignitaries, delegates and other participants were welcomed by Prof.(Dr.) P.G.Kurup, Director, School of Marine Science and Chief Co-ordinator of the Workshop. Dr. Marc Verdegem, Aquaculture Expert, Wageningen Agricultural University, The Netherlands, presented an overview of the two day international

workshop.

Prof. (Dr.) T.J.Pandian, National Professor, Madurai Kamaraj University inaugurated the workshop by lighting the traditional lamp. He called for a National Water Policy and substantial increase in investments in the fisheries sector to realise India's potential for culture fish production. The water policy followed by India was formulated over a century ago by the British and was insufficient to meet today's requirements, said Dr. Pandian.

Another area of insufficiency, he said, was investments in the fisheries sector. Like in other areas of agriculture, economic planners and policy formulators had projected a considerable rise in fish output in the country in the near future. However, he said, investments in the fisheries sector had lagged behind other sectors like meat and poultry. Investment in fisheries was as low as 0.35 per cent of the total investments in the agriculture sector and this had to be raised substantially.

Fisheries contributed to 0.75 per cent of the GNP in 1980 at Rs.9.2 billion and the situation had changed drastically in 1996 with the contribution of fisheries going up to 1.30 per cent with GNP at Rs.109.6 billion. India had to support 16 per cent of the world population with low land availability. This implied that India had to raise fish production and in this, culture fisheries had to play a big role. Dr. Pandian deplored that there were not enough microbiologists to deal with the problem of aquaculture disease in the country, particularly shrimp diseases. He said that the Supreme Court's verdict that extensive aquaculture could be taken up only 500 meters away from the coastline had to be analysed.

Prof. (Dr.) N.R.Menon presided over the function. Prof.(Dr.) R.Damodaran,

Prof.(Dr.) C.Hridayanathan, and Prof.(Dr.)D.M.Thampi offered felicitations. Prof.(Dr.) B.Madhusoodana Kurup, Co-ordinator of the workshop proposed the vote of thanks.

The document brought out by compiling 15 presentations of the workshop was released by Dr.K.Devadas, Director, Central Institute of Fisheries Technology (CIFT). He handed over the first copy to Dr. T.J. Pandian, National Professor, Madurai Kamaraj University, Madurai.

The workshop was organised under six sessions which dealt with : Status of coastal aquaculture and economics of various shrimp production systems, Case studies of sustainable shrimp aquaculture production systems, management of coastal aquaculture farms and environmental impacts, social conflicts confronting coastal aquaculture and finally the Plenary.

Session II: Status of Coastal aquaculture and economics of various shrimp production systems

Dr. T.J.Pandian, National Professor, Madurai Kamaraj University, chaired the session. Mr. Prasadchandran Pillai from state fisheries Dept., Govt. of Kerala and Dr.Boopendranath from CIFT were the rapporteurs. R.Ganapathy and M.Viswakumar, M.P.E.D.A, Cochin, presented a paper on 'Present status and future prospects of Coastal Aquaculture in India'. The paper on 'Improved shrimp farming techniques for environmental stability' was presented by A. Laxminarayana, C.M.F.R.I., Cochin. R.Sathiadhas and Juliet Joseph, C.M.F.R.I, Cochin, presented a paper on 'Economics of diversified coastal aquaculture production systems in Kerala'.

Session III: Case studies of sustainable shrimp production systems

This session was chaired by Dr.D.M. Thampy, Dean, College of Fisheries, Panangad. Dr. M.P.Dileep, Additional Director, State fisheries Dept. and Dr.E.V. Radhakrishnan from CMFRI served as the rapporteurs.

D.M. Thampy presented a paper on 'Integration of Rice and Shrimp farming'.

A paper 'On the successful integration of *Macrobrachium rosenbergii* (de man) in the polders of a tropical wetland ecosystem' was presented by B. Madhusoodana Kurup authored by himself and K. Ranjeet, School of Industrial Fisheries, CUSAT. K.K. Appukuttan and V. Kripa, C.M.F.R.I. Cochin, presented a paper on 'Bivalve farming in India with special reference to possibilities of integration with shrimp aquaculture'. C.N.Mohan, C.E.S.S., Thiruvananthapuram presented a paper 'Mangrove wetlands and aquaculture development in Kerala'.

Session IV: Management of coastal aquaculture farms and environmental impacts

Dr.M.N.Kutty, former FAO Consultant chaired the session. Dr. Harikrishnan from St.Alberts College, Ernakulam and Dr.C.G. Rajendran from College of Fisheries were the rapporteurs.

M.C.J. Verdegem, presented a paper on 'Towards improved sustainability in ponds and re-circulation systems, authored by himself and E.Eding and J.A.J.Verreth, Wageningen Agriculture University, The Netherlands. P. Kesavanath, College of Fisheries, Mangalore presented paper on 'Aquafeeds and Feed Management'. A paper entitled 'Environmental impacts of coastal aquaculture with special reference to treatment protocol' was presented by P.U.Varghese, former Director, M.P.E.D.A. The paper on 'Bioremediation in prawn grow-out systems' was presented by I.S. Bright Singh, School of Environmental Studies, Cochin University of Science and Technology.

Session V: Social conflicts confronting coastal aquaculture

Dr. Marc Verdegem, Wageningen Agriculture University, The Netherlands chaired the session. Dr. N.G.K.Pillai from CMFRI and Dr. Prasad from St.Alberts College, Ernakulam were the rapporteurs.

M.N.Kutty, former FAO Consultant presented a paper on 'Social conflicts in coastal aquaculture with special reference

to socio-economic impacts and sustainable development'. The paper on 'Legislation and Policy requirements for aquaculture management' was presented by G.Santhankrishnan M.P.E.D.A, Cochin.

K.O.Joseph, of C.I.B.A., Chennai presented a paper on 'Changing patterns in the soil and water conditions of the coastal regions due to intensification of shrimp farming', authored by himself, B.P.Gupta, M.Muralidhar and K. K. Krishnani.

A paper on 'Shrimp diseases, aetiology, prevention and control measures in shrimp farms' was presented by P.K.Surendran, C.I.F.T., Cochin.

Session VI: Plenary

The chairmen of all sessions presented their recommendations and these were deliberated and discussed in the plenary under the Chairmanship of Dr. N. R. Menon, Director, C-IMCOZ, Cochin University of Science and Technology and co-chairmanship of Prof. B. Madhusoodana Kurup, Coordinator of the workshop.

The outcome of the two-day workshop, suggestions and recommendations are expected to strengthen the proposed curriculum of Coastal Zone management by Cochin University of Science and Technology.

Recommendations

- There is an imperative need for developing a comprehensive National Water Policy and a National Aquaculture Policy and coherent legal framework for its implementation, in order to promote environment-friendly aquaculture on a long-term sustainable basis.

- Development of a National consensus on Code of Conduct for Responsible Aquaculture, involving all stakeholders, is an urgent necessity for the balanced development of the aquaculture sector.

- Cultured species spectrum in India is confined to a limited number of species, making the aquaculture vulnerable to threats. There is need to expand the

species spectrum for aquaculture, by developing and standardising culture technologies for unrepresented or underrepresented shrimps, sea bass, groupers, crabs, lobsters, scampi, oysters, mussels and other potential organisms, besides seaweed.

- Shrimp aquaculture is at present limited to 12% of the potential brackish water area in the country, producing nearly 1,00,000 t of shrimp annually. Efforts are needed to expand the brackishwater area under culture, by adopting environmentally safer technologies such as modified extensive system and by resolving existing coastal zone management and regulation issues.

- Modified extensive system of aquaculture, which has minimum impact on environment, is sustainable on a long-term basis and needs to be standardized and promoted for increasing shrimp production.

- In-depth research on *Penaeus monodon* culture in low salinity waters and in freshwater, which has shown promise in terms of increased growth and production, needs to be initiated.

- A five-year plan needs to be formulated and implemented with the financial support from government agencies to universities and R&D organizations, for conduction research in order to contain microbial and viral diseases in aquaculture systems.

- Crab farming and crab fattening which are emerging as highly profitable aquaculture practices, need to be standardized and popularized.

- Open sea mussel farming, which has indicated high profitability in experimental operations, needs to be encouraged and expanded.

- A detailed study on water quality parameters of the sites where mussel farming is done shall be carried out. This is required to promote mussels as an exportable item. Ways have to be devised to bring in cooperation between aquaculture and the competing activities in order to derive mutual benefits.

- There must be a government machinery to control and co-ordinate utilisation of water bodies in estuaries, brackish water systems and coastal areas for aquaculture including an integrated coastal zone management programme, to ensure security and profitability of culture operations and encourage entrepreneurship. Demarcation of such areas for culture should be based on case to case basis.

- Hatchery based seed production techniques for crab and other non-conventional cultural species need to be standardized and the technology transferred to end-users.

- Steps may be taken to increase production from traditional rice-shrimp rotational farming systems, by adopting scientific practices and by extending shrimp culture period to accommodate two crops. This may include revision of existing governmental regulations, in order to increase the culture period.

- Integrated scampi/fish-rice farming found successful and profitable in Kuttanad wetland system, needs to be expanded to other suitable areas in the Kuttanad region, to improve overall production and profitability. This system of culture may be replicated in other wetland systems in the state, like *Kole* lands, with provision for adequate and timely seed production and feed supply support.

- Concurrent culture of scampi and/or fish with rice need to be explored with ecofriendly pest management measures in tropical wetland systems.

- Predictive modeling of pond aquaculture production system, basing on the available data sources needs to be developed.

- Use of mangroves as biofilters for management of shrimp farm effluents needs to be studied in the Indian context and standardized.

- Advantages of integrating filter feeding molluscs, fishes and sea weeds (*Gracillaria*) in shrimp aquaculture systems needs to be studied further in terms

of their ability to improve pond water quality and overall yield.

- Research on ecological re-circulation systems for culture of species with high export value needs to be initiated in India.

- Bioremediation technologies need to be evolved for improving efficiency of aquaculture production systems and popularized among farmers.

- Nutritional requirements of currently cultured and potential culturable organisms have to be determined and nutritionally balanced feeds from low cost ingredients and with properties for minimizing environmental pollution need to be developed.

- Use of chemicals should be regulated as per guidelines of Aquaculture Authority of India in shrimp culture ponds for prevention or treatment of diseases. Similarly, applications of feed additives, disinfectants, and chemicals for removal of other fish or for treatment of soil or water needs to be regulated. The use of antibiotics/drugs should be avoided.

- Responsible aquaculture needs to be an integral part in any coastal zone developmental plan.

- Extension training and education of farmers in responsible aquaculture practices needs to be strengthened further.

- There is need for coordination of all the developmental activities of coastal zone through an appropriate legal set up and administration.

- Efforts may be made for exchange of information on sustainable methodologies used in aquaculture.

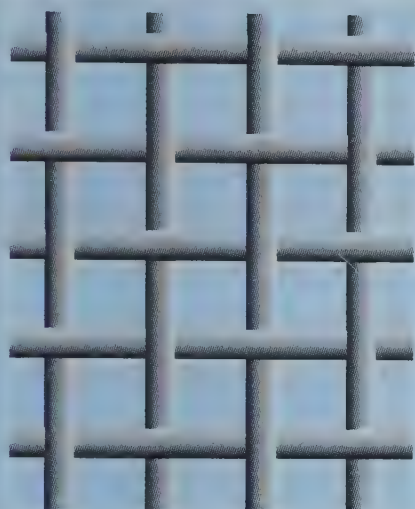
Dr. Rosamma Philip, Reader and coordinator of the workshop, profusely thanked all the resource persons, panel members, officials of the various department, research fellows, farmers, sponsors and officers of CUSAT for their contribution and support in making the workshop highly successful. ☺☺☺

Aquaculture

PRECISION FABRICS FOR AQUACULTURE

ligdag marketing private limited, pune

REPRESENTS SEFAR, SWITZERLAND IN INDIA FOR THEIR
ENTIRE PRODUCT RANGE FOR HATCHERIES / AQUACULTURE
AND OTHER ALLIED USES SUCH AS



PLANKTON NETS FOR TRAWLING AND
GRADING OF NATURAL PLANKTON.

LANDING NETS AND DIP NETS.

NET CAGES FOR FINGERLING PRODUCTION.

CONTROL SIEVES AND CONTROL FILTERS.

FILTER FABRICS FOR WATER PURIFICATION.

DESCALING SIEVES.

SLUICE SCREENS.

FEED SIZE SEPARATION.

THE ABOVE INCLUDES PRECISION SIEVES (SYNTHETIC MESH) OF DIFFERENT
MATERIAL WITH MESH GRADING (OPENING) FROM 5 TO 5000 MICRONS.

FOR GENUINE SEFAR PRODUCTS OF PRECISION QUALITY AND HIGH DURABILITY,
CONSUMERS ARE REQUESTED TO CONTACT LIGDAG / ECMPS..

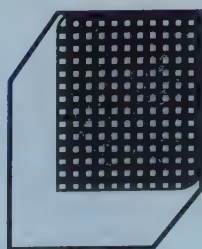
EAST COAST MARINE PRODUCTS AND SUPPLIES

"PARULIKA", 17 DASPALLA HILLS, VISAKHAPATNAM 530 003
TEL: (0891) 563982, 705425 FAX : (0891) 567090.
E-Mail : bbdas@satyasaionline.net.in



SEFAR INC

FILTRATION DIVISION,
CH-9410, HEIDEN,
SWITZERLAND



ligdag marketing private limited

FLAT NO. 3, SHIVKRUPA APARTMENTS,
PLOT NO. 61, S.NO. 78, BHUSARI COLONY,
PAUD ROAD, KOTHRUD, PUNE 411 029.
TEL: 020 - 5280508 FAX : 020 - 5280365
E Mail - logis@ip.eth.net

AQUA FARMER'S BEST KEPT SECRET

Oxy

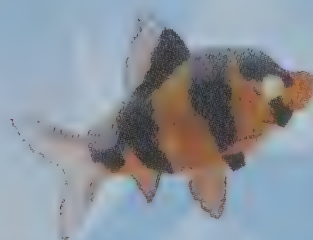
bursting
more



Oxyflow[®]

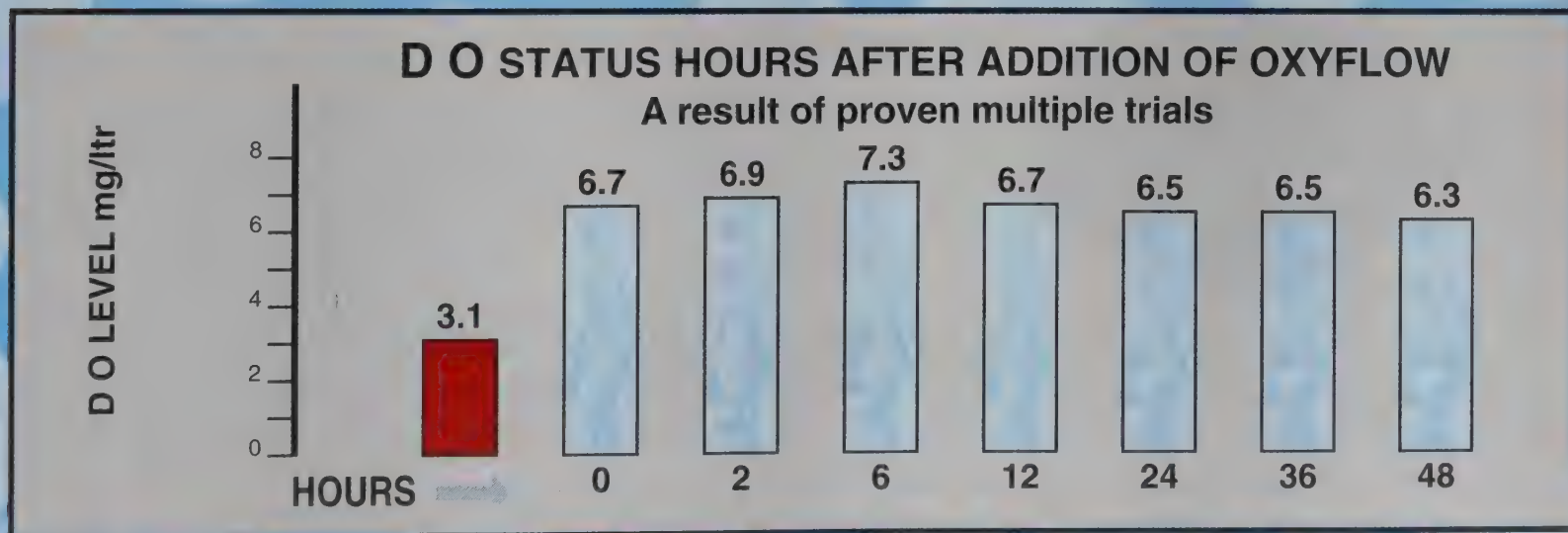
with Oxygen

more
Oxygen
less
dose



Oxyflow Advantages :

- * Oxyflow boosts D.O. levels quickly and the levels are maintained for more than 48 hours.
- * Oxyflow improves livability, maturity, breeding and growth at all ages.
- * Oxyflow is effective in the presence of organic matter, lack of photosynthetic activity and at different levels of water hardness.
- * Oxyflow eliminates toxic gases, assures better health and weight gain.



® Registered Trade Mark of Guybro Chemical



GUYBRO CHEMICAL

C-58 Jeet Nagar, Versova, Mumbai - 400 061.

E-mail : guybro@guybro.com • Web : www.guybro.com • www.toxinbinder.com

MORE PROFIT WITH **Oxyflow**

We make for the fisher folk their **rope, twine & nets**,
and **moor ships** in stormy waters.

We **rope in Industrial** heavy weights,
design **slings** for material handling
& **safety nets** for their workmen.

We give little **dolls** their golden hair,
and for industrial **stitching** we provide the twine & yarn

Our camouflage **nets** have been to war and back.

Our **sports nets** have seen the Grand Slams.

While our ropes **lash Transport Trucks** safely,
the **Geo textile** we develop, preserve land.

Our range of products are **special**

They touch lives.



www.garwareropes.com

Corporate Office :	Ph : 91-20-7473931/32
Garware-Wall Ropes Ltd.	Fax : 91-20-7470141
M.I.D.C. Chinchwad	E-mail : domestic@garwareropes.com
Pune - 411 019, India	

Fishing in the Indian Ocean

Sebastian Mathew

Executive Secretary, Intenational Colletive in Support of Fishworkers

27 College Road, Chennai-600006

The Indian Ocean and its adjacent seas have the largest number of active fishermen in the world. And nowhere else have so many fishermen been killed, fired on, or arrested. According to press reports, over the last decade, about 200 fishermen have been shot dead in the region, and hundreds injured. In the last four years, around 1,500 fishermen have been arrested. Some of them have languished in foreign jails for up to three years. This takes place despite the fact that imprisonment, as a penalty for violating fishery regulations, is contrary to the provisions of the 1982 United Nations Convention on the Law of the Sea (UNCLOS).

While death by firing is mainly confined to the waters between India and Srilanka, arrests and detention are reported from all over the Indian Ocean region; Of Indians by Somalia, Pakistan, Sri Lanka, Maldives and Bangladesh, Of Pakistanis by Iran and India, Of Burmese by Bangladesh and India, Of Eritreans by Yemen from the Red Sea to the Arabian Sea. From the Bay of Bengal to the Indian Ocean, there are hundreds of cases of fishermen being arrested and detained by authorities for undertaking fishing activities or for just being found drifting in alien waters.

What is most shocking about these incidents is that these are just small-scale fishermen working on board vessels that are 10 to 12 m in length, with barely enough space to stretch their back, some working for a wage, and some for a share of the catch. But why does a fishermen illegally cross the international maritime boundary, risk arrest and detention, and sometimes even face bullets?

First of all, fishermen get arrested out of sheer ignorance about maritime boundaries. There are no easy ways to demarcate boundaries at sea, unlike on land.

Unless you know your coordinates for which you need navigation equipment, you might very well end up in neighbouring waters and in jail. Sometimes, fishermen accidentally drift into neighbouring waters because of engine failure or strong currents.

Second, some maritime boundaries are unresolved, as between India and Pakistan in the Sir Creek area. Fishermen have no clue if they have the right to fish where they would like to, especially in fishing areas of contested waters. Even if fishermen from both sides do not have any problem in sharing a fishing ground, this seems to be the case between Karachi and Porbandar fishermen, for instance the coast guard often arrest them. In this context, the instruction of the Prime Minister, Mr. Atal Behari Vajpayee, to the Coast Guard on July 4 to hereafter turn away and not arrest Pakistani fishermen in Indian maritime waters was a welcome move. This measure, announced before the Agra summit, still awaits reciprocal action from Pakistan.

Third, fishermen cross over because they think it is morally right to continue to fish in areas where they had enjoyed traditional fishing rights. Indians, for instance, have traditionally fished around Kachchativu in the Palk Strait, which is today part of Sri Lanka. Eritreans and Yemenis have traditionally fished in the waters of Zuqar-Hanish and Zubayr groups of islands in the Red Sea, which are now divided between Eritrea and Yemen.

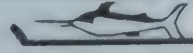
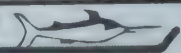
Fourth, and most important, fishing in other exclusive economic zones (EEZs), the marine space within which the coastal state has exclusive right to living and non-living resources, occurs because of too many boats chasing too few fish in national waters. Take, for instance, the Rameswaram trawlermen

crossing over to Sri Lankan waters, braving bullets. They take that risk since the shrimp fishing grounds on the Indian side are depleted, while rich shrimp resources exist on the Sri Lankan side. Similarly, Sri Lankans from the south of the country- mainly from Negombo - go all over the Indian Ocean, prompted by the lack of productive fishing opportunities in their waters and the abundance of tuna resources in other EEZs.

This unprecedented migration of fishing vessels has been facilitated by technological development in the small-scale sector. Improved and affordable technology to the small-scale sector to target fisheries resources even in distant waters became available in the 1990s. Global positioning systems (GPS) and radio communication; hull, nets, hooks and rope made of stronger and lighter material; and growing markets for fish and fish products, have emboldened the small-scale fishermen to venture out into distant fishing grounds.

What should be done about this "illegal" fishing and cross-border migration of fishermen? Different approaches are needed. Fishermen found drifting or stranded need to be treated with compassion. There should be a mechanism to immediately send them back home. If the fishermen are from neighbouring countries the Coast Guard should turn them back if they are found within reasonable limits of the maritime boundaries.

As for traditional rights, there are legal provisions to accommodate such fishing rights that fall outside national jurisdiction, although these provisions are seldom implemented. In spite of some ambiguity in the interpretation of the 1974 Agreement between Sri Lanka and India one can still infer (from Articles 5 and 6) access rights to Kachchathivu for Indian fishermen, which they have tra-



ditionally enjoyed before the Agreement came into force. Provisions to fish are also made for traditional Indonesian fishermen to fish in the Australian exclusive fishing zone. The 1998 Tribunal of the International Court of Justice for Eritrea-Yemen arbitration on sovereignty over Zuqar-Hanish and Zubayz groups of islands in the Red sea ruled that even on islands where sovereignty was awarded to one country, traditional fishing rights of fishermen from the other country should be guaranteed.

Under UNCLOS, there are provisions for a country to share its surplus total allowable catch (TAC) with others. But, so far, such arrangements have only been negotiated for large-scale or industrial fishing vessels. As small fishing vessels have significantly improved their range of operations, Governments in the Indian Ocean region should start negotiating fisheries agreements with each

other. There are tuna resources, for example, in the waters of the Indian Ocean that are under-used or harvested by industrial fishing vessels originating from outside the region, from Japan, Taiwan, France, Spain, and Italy. They fish about 470,000 tonnes of tuna and tuna-like fish from Indian Ocean says the Indian Ocean Tuna Commission.

Successful fisheries agreements can be negotiated between countries with excess capacity in small-scale fisheries, such as Sri Lanka and India, with countries such as Seychelles, Madagascar, Mozambique or Somalia. These agreements should recognise the importance of responsible fisheries management and make provisions for non-destructive small-scale fishing techniques and practices.

Access arrangements should be subject to licensing requirements. Countries in the Indian Ocean that provide access

to their fishery resources should also be paid an access fee, at least equal to the share of the landed value that they currently earn in access fee from non-riparian industrial fishing nations. Riparian arrangements between countries in the region can lead to better living standards for small-scale fishermen, reduce pressure on national fishing grounds, and help transfer small-scale fishing technology from, for example, South Asia to East Africa and islands in the Indian Ocean.

We must recognise the many factors that contribute to the accidental or intentional movement of fishermen across boundaries. A judicious mix of compassion, recognition of traditional rights and development of legal regimes to facilitate formal movement of small-scale fishing vessels could contribute significantly to put an end to the shameful drama that is now a feature of the Indian Ocean. ☺

Global shrimp market recovering after severe recession

The international market for shrimp is beginning to show signs recovery after a recession in recent months, much to the relief of the Indian seafood export industry.

According to industry sources, the recovery, mainly Japan and the US, is not only in terms of price realisation but consumption of shrimp.

The market revival for the exporters has come sooner than expected with HL black tiger shrimp prices to Japan firming up appreciably to touch \$ 12.00 a kg for 16/20 count in the first week of Dec 2001 with indications of an upward trend.

The Indian shrimp export market had virtually nosedived in recent times, the price hitting the lowest level in many years at \$9.5 per kg. in November last. Seafood exporters' hope of a market revival did not materialise

when the recession showed signs of further hardening up in the light of the terrorist strikes on the US on 11 Sept. The slump in market had forced exporters to slash their procurement price resulting in state holders in the mechanised sector keeping their vessels off the sea in protest for some time.

With even the bankers tightening up the finance flow into the industry in the wake of the adverse reports of the shrimp market crash, the Marine Products Export Development Authority (MPEDA) made strenuous efforts to neutralise the fears of the Indian seafood exporters.

According to MPEDA, the total seafood exports from India till September 30 during the current fiscal were 1,51,620 tonnes valued at Rs.2,832 crores as against the 1,40,091 tonnes valued at Rs.3,004 crores during the corresponding period of 2000-01. As

usual, frozen shrimp constituted the major chunk of the shipments at 60,992 tonnes valued at Rs.2,188 crores as against the 56,471 tonnes valued at Rs.2,344 crores during April-September in the last financial year.

The fall in terms of value is attributed to the drop in average unit value realisation for marine products from \$ 4.79 per kg. during 2000-01 to \$ 3.97 per kg in 2001 - 2002 so far. The overall fall in terms of rupee is 5.75 per cent and in dollar terms, 10.75 per cent.

Frozen finfish has been the next major item in Indian seafood exports, the shipments of this species during April-September being 43,761 tonnes (valued at Rs.201 crores) followed by frozen cuttlefish of 11,063 tonnes (Rs.107 crores) and frozen squid 18,642 tonnes (Rs.152 crores). ☺☺☺

CIFT - TED

Construction, Installation and Operation

Percy Dawson and M.R. Boopendranath
Central Institute of Fisheries Technology
P.O. Matsyapuri, Cochin-682 029, India

Sea turtles are an ancient and widely distributed species whose migratory pattern extends over all the oceans of the world. Due to harvesting of sea turtles and their eggs and their accidental mortality associated with shrimp trawling and other fishing operations, turtles have been threatened with extinction in all parts of the world. Accidental catch of marine turtles are reported to occur particularly along the east coast of India. Marine turtles are endangered species, which are protected under Schedule I of the Indian Wildlife Protection Act 1972. They are also protected under the international conventions such as Convention on Migratory Species (CMS) and Convention on International Trade on Endangered Species of Wild Flora and Fauna (CITES), to which India is a signatory. Of the seven species of sea turtles found world wide, five are reported to occur in India. They are Leatherback (*Dermochelys coriacea*), Green turtle (*Chelonia mydas*), Hawksbill (*Eretmochelys imbricata*), Loggerhead (*Caretta caretta*) and Olive Ridley (*Lepidochelys olivacea*), of which Olive Ridley is the most common species.

Researchers have developed special equipment known as Turtle Excluder Device (TED) that greatly reduces incidental death of sea turtles in shrimp nets. TEDs were introduced in US shrimp trawling operations in 1980s. A TED is a frame consisting of a grid of bars installed before the codend of the trawl net at an angle leading upward and downward to an escape slit. Small animals such as shrimp, slip through the bars and are retained in the codend, while large animals, such as turtles, large fishes and large elasmobranchs are stopped by the grid bars and can escape through the opening. Experience has shown that the use of TEDs when combined with other elements of an integrated turtle conserva-

tion, can stop the decline in sea turtle population and will, over a period of time, lead to their recovery. Expert Scientific Panel (March, 2000) in their Report Study on the Distribution of Sea Turtles, their Incidental Mortalities in Fishing Nets and Use of Turtle Excluder Device in Fishing Trawlers, submitted to the Ministry of Agriculture, Government of India, has recommended the mandatory use of TEDs by all mechanized trawlers operating in areas where higher incidental mortalities have been recorded, in Indian waters.

Shrimp is the major foreign exchange earner contributing to over 70% of the marine products export earnings. Section 609 of Public Law 101-162 of the US restricts imports of shrimp harvested with fishing equipment such as trawl nets which are not equipped with TEDs that result in incidental mortality of sea turtles. The law ensures that US market demand for imported shrimp does not involve the Endangered Species Act. In October 1996, India, Malaysia, Thailand and Pakistan requested consultation with the United States under WTO dispute settlement procedures regarding US import restrictions, claiming that it is inappropriate for the US to prescribe their national conservation policies. In April 1998, WTO ruled that the trade restrictions were illegal. However, arguments are gaining ground that US laws are covered under exceptions to WTO rules for measures relating to conservation of exhaustible natural resource, but only failed in the way in which the law was administered.

The Code of Conduct for Responsible Fisheries (FAO 1995), which gives guidelines for sustainable development of fisheries, prescribes the need for protecting endangered species like sea turtles. As a signatory, India is duty-bound to conduct research, develop ap-

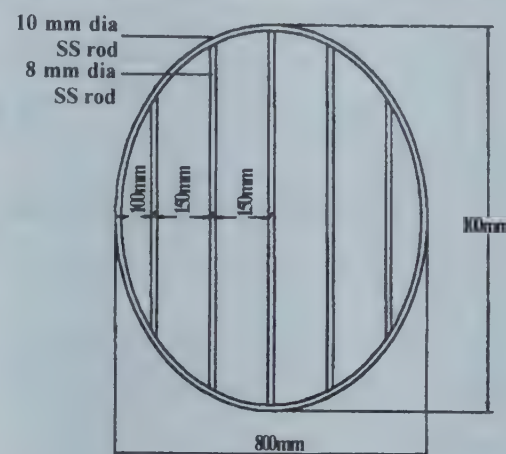


Fig 1. 1000x800 mm CIFT-TED design.

propriate devices and practices, and implement regulatory measures for the protection of endangered turtles.

Shrimp trawling is currently the most valuable fishing system in India, in terms of the export earnings and domestic supply for fish. Concerns expressed by trawler fishermen over the lessening quantity of shrimp and fish by-catch owing to the installation of TEDs has to be taken into consideration. Standardization of TED for regional bottom trawling operations has to take place before regulations in terms of its mandatory use,

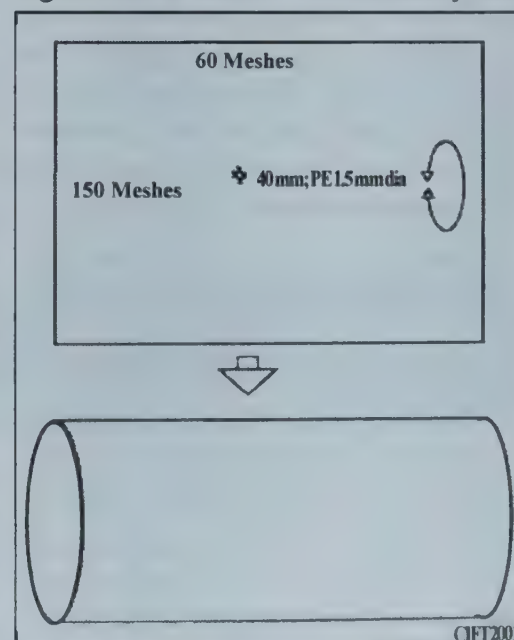


Fig 2. Construction of CIFT - TED Extension.

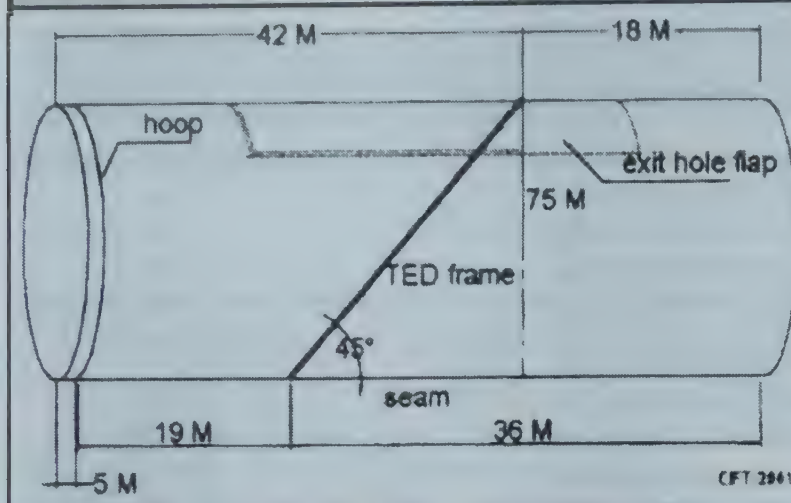


Fig 3. Fixing the grid at the correct angle.

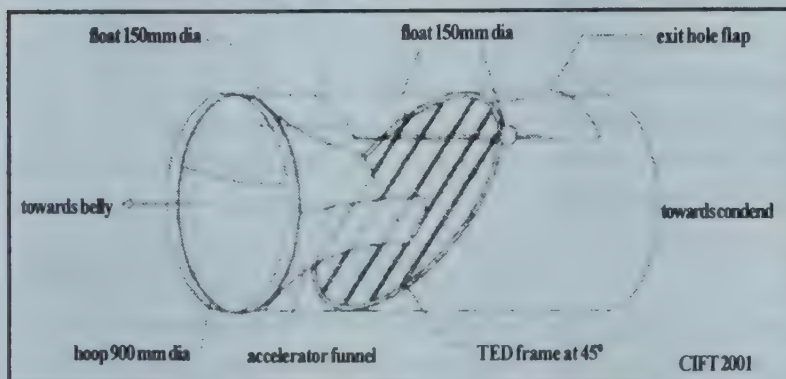


Fig 4. Perspective view of TED extension.

can be brought into operation. Trade barriers by the environmentally conscious importing nations of Indian shrimp are still a perceived threat, unless regulatory measures are taken up.

Construction and Installation of CIFT - TED

Construction of the Frame: An oval frame measuring 1000x800 mm is constructed of 10 mm diameter stainless steel rod. Five vertical grid bars of 8 mm diameter stainless steel rod are welded to the inside of frame. The spacing between deflector bars is 142 mm and the maximum spacing between the frame and the adjacent deflector bar is 86 mm (Fig.1).

Construction of TED extension: The TED extension is constructed of single piece of polyethylene netting of 40 mm stretched mesh size and 1.5 mm diameter twine of size 150 x 60 meshes. The 60 mesh sides of the netting piece are sewn together to construct a cylinder (Fig.2).

Construction of hoop: A single hoop having a diameter of 900 mm is constructed of 8 mm stainless steel rod, for attachment to the leading edge of the TED extension (Fig.3).

Fixing the grid at the correct angle:

The hoop may be laced to the TED extension leaving 5 meshes from the leading edge. For ease of installation, another hoop could be attached to the other end of the extension. The TED frame may be slid into the extension. Using the hoops, the extension tube may be stretched so that it is taut. The TED extension may be so positioned that the extension seam is at the bottom. Starting from the rear edge of the extension, 36 meshes may be

counted forward along the seam and the bottom centre of the TED frame may be attached to the netting. 18 meshes forward from the rear edge of extension along the seam may be counted followed by counting of 75 meshes perpendicular to the seam to arrive at the top centre attachment point. Later the TED frame may be attached to the extension netting (Fig.3 & 4). The sides of the secured TED frame may then be sewn to the extension netting. Grid angle should be between 40 to 55° from the horizontal, for proper operation.

Cutting the exit hole: The 1/2 mesh cut may be begun in front of the top centre of the TED frame and continued to cut along the frame maintaining 1/2 mesh distance from the frame, to either side until 1st and 5th grid bars are reached. The distance between 1st and 5th grid bars is 620 mm. 19 meshes may be turned and cut forward on either side. They may be turned again and cut to obtain a rectangular opening of 40 x 19 meshes in the extension.

Construction and attachment of exit hole cover (flap): The exit hole cover is

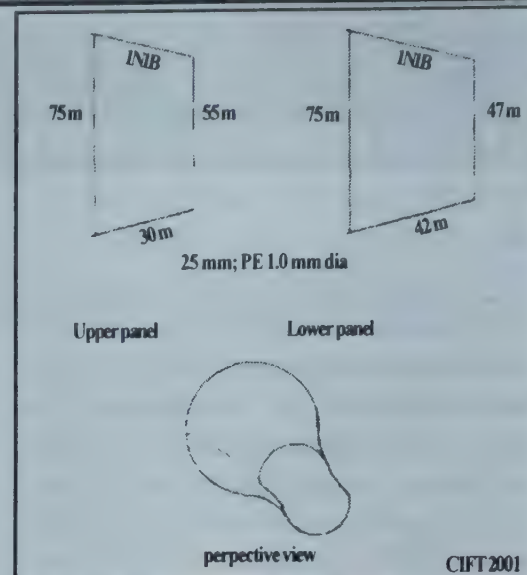


Fig 5. Construction of accelerator funnel.

made of a single piece of depth stretched and heat set polyethylene netting of 96x50 meshes, with 25 mm stretched mesh size and 1.0 mm diameter twine size.

The centre mesh of 96 mesh edge of the flap may be attached to the centre mesh of forward edge of the exit hole opening and this may be continued to 45 meshes of the flap to 20 meshes of the opening on either side of the attachment point. Remaining meshes of the flap may be sewn to the extension meshes to provide strength and shape to the flap. Along the sides may be attached 30 meshes of the flap to 19 meshes of the extension ahead of the TED frame. Six meshes of the flap may be attached to 4 meshes of the extension ahead of the TED frame. The remaining 14 meshes of the flap are to be left unattached.

Construction and installation of accelerator funnel: Two trapezoidal pieces of depth stretched and heat set polyethylene netting (25 mm stretched mesh size and 1.0 mm diameter twine size) with 75 meshes each in the leading edge may be cut; 30 and 42 meshes each in depth with a cutting rate of 1N1B resulting in 55 and 47 meshes, respectively, in the rear edge (Fig.5). The two pieces are sewn together along the tapered edges, beginning from the leading edges, to form the funnel. The funnel may be installed inside the extension, forward of TED frame with the longer half of the funnel positioned opposite to the exit hole. The funnel is sewn

to the TED extension, immediately after the hoop, which is attached to the leading edge. Attach 150 meshes of the funnel may be attached, mesh to mesh to the 150 meshes of the extension. The longer half of the funnel, may be secured at appropriate intervals, to the grid bars, a few centimetres from the bottom.

Attachment of floats: Two 150 mm hard plastic floats are to be attached to the outside of TED on the upper side, to the frame at the junction of outer grid bars, and another float is to be attached to the top of the hoop as shown in Fig.4, for weight compensation and stability, during operation.

Installation of TED in trawl: The completed TED is installed between codend and hind belly/extension of the trawl, with the exit hole facing upwards, by joining

the edge meshes.

Operation and Maintenance

Before shooting the gear, the net should be inspected to ensure that the netting ahead of the TED is not twisted. The speed of vessel should be increased before deploying the otter boards, so that the TED extension will ride high in water and twists, if any, could be easily detected. If twists are present, they should be removed before deployment of the gear.

While hauling the gear, it is better to keep the vessel against the current or maintain a low speed, in order to prevent the catch from being washed forward, to the exit hole. Once the otter boards are hauled up, the vessel should maintain speed and direction for a few minutes so that all catches are washed past the TED, into the codend. After each haul, the

accumulated trash and debris that may clog the grid may be removed. Also, any gilled fish in the netting around the TED may be removed in order to permit good filtration.

It is important to check the grid angle on a regular basis, and make sure that it is between 40 to 55°, from the horizontal. This can be done as follows:

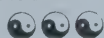
- * An even row of meshes around the trawl body located approximately 1 m forward of the TED frame, may be gathered and tied tightly with a whip line;
- * Using the whip line, the TED frame may be suspended freely, about 1 m off the deck, ensuring that there are no twists;
- * The angle of the grid bar to the horizontal may be meshed by using a carpenter's protractor, inserted through the exit hole.



Dr. S.Z. Qasim Gold Medal (2000) Conferred on Dr. K. Pani Prasad



Dr. K. Pani Prasad, Scientist, Fish Health Management Laboratory, Central Institute of Fisheries Education, Mumbai receiving the Dr. S.Z. Qasim Gold Medal for the year 2000 of the Society of Biosciences from Dr. Harsh K. Gupta, Secretary, Department of Ocean Development, New Delhi on 11th September, 2001 during the National Symposium on 'Basic Sciences and Fisheries' held at CIFE



Hatchery control system

AutoFarm is a complete hatchery management system for control and monitoring of hatchery parameters. It controls feed rates, lighting control for photo period manipulation and monitoring of alarms. Other features include dual alarm output and IBM PC control.

Feeding rates, light control and alarms can be set and monitored with the keypad and display on the main controller. The simple sequential menu system allows easy alternation of parameters. IBM PC control through an RS232 link enables alteration and monitoring of all parameters in a user friendly Windows 95/98 environment. Parameters can be stored and reports generated on a PC remote from the main unit.



Culture tanks

Biopromasz Bipron Trading of Poland has a wide range of square, circular, conical or raceway tanks for use in fish culture. The tanks are made of high quality durable fibreglass reinforced with polyester. Each tank is equipped with bottom drainage of stainless steel or aluminium, PVC or stainless steel outlet pipes, overflow outlets, flanged collar tops and legs made of hot-dip zinc coating steel or impregnated wood. Tanks are designed in such a way as to limit "dead" or unproductive space. Various colours are available.



Shrimp waste to pharmaceuticals

Indonesia's Marine and Fisheries Ministry together with PT Philip Seafood and a German company plan to build a factory to process shrimp and squid waste into preparations widely used in the pharmaceutical industry.

In the first phase, investment is estimated to be Rp800 million to provide a facility with a processing capacity of 10,000 tons a year.



Rehydration Capacity of Different Dried Prawn Products

K.N. Mohanta

College of Fisheries, Rangailunda
Berhampur - 7, Orissa.

(Presently working as a Scientist, ICAR RC-GOA, 403 402)

Fish, one among the most perishable food items, needs preservation for long term storage and utilization by humans. There are two main methods of preservation, namely, traditional and modern. Among the different traditional methods of fish preservation, fish curing is the oldest and the cheapest one in vogue. Fish curing includes the process of sundrying, salting, smoking etc. Of these, drying method is the most widely used in the country. Fish drying implies the removal of moisture content from its body by heat treatment. This prevents growth of micro-organisms which cause spoilage. This method also helps in preserving the fish for a long time. The factors affecting fish drying are relative humidity, wind speed, girth of fish, its initial moisture content, etc.

Next to fish curing, it has to be mentioned that accelerated freeze-drying happens to be the most modern method of fish preservation. Here the material is dried in a frozen state. This method pre-

vents shrinkage of fish. It encourages better reconstitution than any other method.

The dried products (fish/prawn) of any kind are generally soaked in water to make them soft before being used for cooking. This practice is known as rehydration. Rehydration is otherwise known as restoration/reconstitution. It is the process in which the dried product is soaked in water to attain almost its normal condition. Very little work has been done on the rehydration capacity of different fish and fishery products. The present study aims at finding out a comparison between the rehydration capacity of the dried prawns collected from the market, dried prawns prepared in the laboratory and also the prawn pulp prepared in the laboratory.

Materials : Dried prawn (about 8 to 10 cm in length) were purchased from Berhampur fish market for the study and named as sample - I.

Fresh prawns in the above mentioned size range were collected from Gopalpur landing centre. They were taken in plastic trays to the laboratory and washed thoroughly in clean water to remove the extraneous matter adhering to them. The washed fresh raw materials were used for the preparation of different prawn products. The method of preparation of these products are given hereunder :

Preparation of Laboratory Dried Prawns : About one kg of fresh cleaned prawn was taken in a metallic tray and spread uniformly in it. It was dried in a hot air drying oven at a temperature of 60 - 80°C for about 4-5 hours till the moisture content came down to 8-10%. The dried prawns were then cooled and packed in a polyethylene bag and stored at room temperature for the experiment. It was named as sample - II.

Preparation of Dry Prawn Pulp : Half kg of headless shell on prawn was taken and washed thoroughly in clean water. The prepared prawn was boiled in 10% saturated brine solution for 30 minutes. The cooked prawn was taken out and fan-dried for about 15 minutes. Then it was dried in hot air oven at 60-80°C for about 4-5 hours till the moisture content dwindled to 8-10%. The dried prawn was then slowly hammered to remove the shell and so as to obtain the dry prawn pulp. The product was packed in polyethylene bag and stored till it was used for the study. It was named as sample - III.

Method : The different samples of about 10 g each were taken for the experiment. They were soaked in 100 ml of water in different beakers. The rates of rehydration were observed at intervals of one hour upto 8 hours. Each sample was taken in triplicate for the observation. Before retrieving out of the water, the moisture adhering to the prawns was wiped using filter paper.

Results : The rate of rehydration of the marketed dried prawn within a time period of eight hours is given in Table 1. Initially the rate of rehydration was observed to be 12.1% which increase significantly till fourth hour. Afterwards the

Table 1. The rate of rehydration of the dried prawn (Source : market) within eight hours.

Time (hrs)	Sample wt (g)	Sample wt (g) after dehydration	Rate of rehydration (%)
1	10.2	11.435	12.1
2	10.4	11.690	12.4
3	9.8	10.150	13.8
4	10.3	11.760	14.2
5	10.1	11.525	14.1
6	9.7	11.085	14.3
7	9.8	11.180	14.1
8	10.2	11.640	14.1

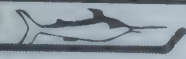


Table 2. The rate of rehydration of the laboratory dried prawn within eight hours.

Time (hrs)	Sample wt (g)	Sample wt (g) after Rehydration	Rate of rehydration (%)
1	10.1	12.445	23.2
2	10.0	12.380	23.8
3	9.9	12.525	26.5
4	9.8	12.430	26.8
5	9.8	12.415	26.7
6	10.2	12.905	26.5
7	10.1	12.770	26.4
8	9.9	12.515	26.4

rate remained almost constant varying between 14.1 to 14.3% within the next four hours.

Table 2 shows that rehydration of the laboratory dried prawns within an eight hour period. Initially the rate of rehydration was observed to be 23.2%. However it increased significantly upto the fourth hour. Afterwards the rate remained constant varying between 26.4% to 26.5% within the next four hours.

Table 3 shows the rate of rehydration of the dry prawn pulp within a time period of eight hours. Initially the rate of rehydration was observed to be 35.3%, while it increased significantly upto the fifth hour. Afterwards, the rates remained almost constant varying between 38.4 to 38.6% within the next four hours.

Table 3. The rate of rehydration of the dry prawn pulp within eight hours

Time (hrs)	Sample wt (g)	Sample wt (g) after Rehydration	Rate of rehydration (%)
1	10.2	13.805	35.3
2	10.1	13.825	36.9
3	10.1	14.050	39.1
4	9.8	13.690	39.9
5	9.9	13.850	39.9
6	9.7	13.445	38.6
7	9.9	13.710	38.5
8	10.2	15.115	38.4

Discussion : The present study has been aimed at finding a comparison between the rates of rehydration capacity of the three different types of dried products such as marketed dried prawns, laboratory-dried prawns and laboratory prawn pulp. It has been observed that the rate of rehydration of the marketed dried prawns, dried prawn prepared in the laboratory and dry prawn pulp prepared in the laboratory

varied between 12.1 to 14.3%, 23.2 to 26.8% and 35.3 to 39.9% respectively. Govindan (1985) had observed that cooked prawns rehydrate better than raw prawns. This experiment has confirmed his observation. However, among marketed dried prawns and laboratory dried prawns, the later was found to be having a better rehydration capacity than marketed dried prawn. The low rate of rehydration is attributable to the irregular changes that generally take place during the drying (protein denaturation) and the severe damage suffered by the cellular structure. The compressed product is found to be absorb slowly and less completely (Bergsterm, 1962). Bergsterm has also reported that prolonged soaking of dried prawn before cooking is undesirable as it can be a potential bacteriological hazard.

Govindan (1985) has observed that denaturation of actomy-sin increased with increase of temperature and length of storage. The rate of rehydration of the product is also seen to decrease with increase of temperature and storage. It appears that the best way to promote rehydration is to conserve the porous parts which will absorb and retain sufficient water

by capillary action.

Conclusion

The present study was aimed at finding out a comparison of the rehydration capacity of dried prawns of a few categories. The marketed dried prawns were seen to be having less of capacity at rehydration than dried prawns prepared in the laboratory. However, the dried prawn pulp was found to be having the highest rate of rehydration attaining a level of almost 40% compared to the other two different samples of dried prawns.

References

BORGSTOM, G (Ed)., 1961. Fish as Food, Vol. I, Academic press, New Wordk.

GOVINDAN, T.K. 1985. Two modern technologies employed in Fish preservation. In Fish Processing Technology, Ch. 8, pp. 180 - 198. 🐟🐟🐟

Russian Fishing Industry facing problems

According to Russian media, the fisheries sector is plagued by inadequate processing facilities, and an out-dated fleet. The poor enforcement of regulations has also led to illegal fishing on a large scale, causing the fast decline of resources in the EEZ. Chairman of the State Fishery Committee, Yevgeny Nazdratenko has suggested that the EEZ be closed for several years to allow stocks to recover and in the meantime negotiate for greater access in other parts of the world. Another proposal was for hunting of small whales and seals to be resumed, as he believed that these resources were not endangered. 🐟🐟🐟

Philippines fishmeal demand grows

In a recent report, the U.S. Department of Agriculture highlighted the growing demand for fish meal in the Philippines. The report noted that imports for last year were nearly 80,000 tons, up 14% from 1999. Peru captured 80% of the market with 63,885 t. The U.S. and Chile followed with 6,445 and 6,257 t. respectively. 🐟🐟🐟

AWARD OF MEDALS AND RELEASE OF CIFNET PUBLICATIONS

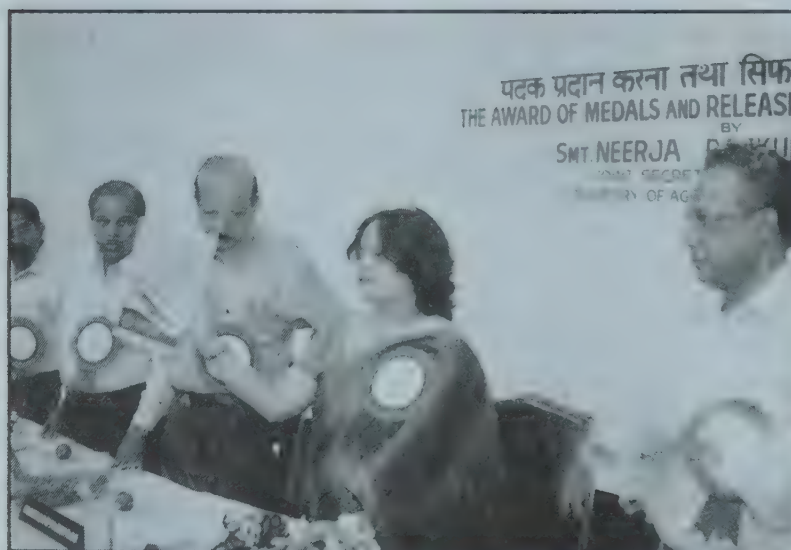
AT CIFNET, KOCHI : 27TH NOVEMBER 2001

The function for the award of medals and release of CIFNET study materials was held in at CIFNET's Headquarters on 27th November 2001. The function was inaugurated by Ms. Neerja Rajkumar, Joint Secretary (Fisheries), Ministry of Agriculture, Department of Animal Husbandry & Dairying, Govt. of India by lighting the traditional lamp. In her address, the Joint Secretary highlighted the role of CIFNET in offering training in various disciplines like fishing technology, and nautical science and engineering. She stressed the need for a collective effort in diversifying the training

batch) and Akash. R. (1999-2000 batch) and Dr. C.P. Verghese Medals for the best trainee of Engine Driver Fishing Vessel Course (EDFVC) to Dilip Kumar (1996-97 batch), Senthil Kumar (1997-99 batch) and T.V.Sajeev (1999-2000 batch). The CIFNET publications on seven technical subjects, a pioneering effort, which would serve as study materials for the various courses, were released by Neerja Rajkumar on the occasion. The books on Fish Biology and Fish Handling (prepared by Dr. S.Bijoy Nandan), and Meteorology (prepared by Dr. Jomon Joseph) were also released and handed

Hindi version of the book on Fish Biology (prepared by Dr. S.Bijoy Nandan) was also released by the Joint. Secretary and handed over to Dr.V.S.Somvanshi, Director General, Fishery Survey of India (FSI), Mumbai.

Mr.M.K.R.Nair, Fisheries Development-Commissioner, who could not attend the function due to Parliamentary and other pressing work, had sent a message wherein he appreciated CIFNET's efforts to publish study materials in the wake of severe dearth of such publications. He also congratulated the Director and authors of the books for this ex-



Neerja Rajkumar releasing CIFNET publication



A Section of the participants

programmes conducted by the institute, so that they could be made more useful to the fishing industry. She also opined that with the excellent infrastructure facility and the efficient faculty, CIFNET could play an increasingly pivotal role in shaping future fishery training programmes of the country. She lauded the services rendered by the Director of the Institute, Dr. C.P.Verghese.

The Joint. Secretary gave away the D.A.S Gnanadoss medals for the best trainee of Mate Fishing Vessel Course (MFVC) to Sayooj Jospech. P.J.(1996-97 batch), Vipin Joseph Vacco, (1997-99

over to Prof.C.Hridayanathan, Director, School of Industrial Fisheries, Cochin University of Science & Technology. The book on Elementary Marine Engineering of MFVC (prepared by Mr. C.Rethinadas), Practical Navigation for MFVC (prepared by Mr. K.C. Udayaprakasan), Basic Electronics and Fish finding equipments for MFVC/ EDFVC (prepared by Messers.C.D.Joshy & and M.Devadhason) and Chart Work for MFVC (prepared by Mr. M.P.Mohan) were received by Mr. M.P.Mohan, Engineer and Ship Surveyor, Mercantile Marine Department, MMD, Kochi. The

cellent venture.

Mr. M.K.Devaraj, Deputy Director, CIFNET Unit, Visakhapatnam, who took over as Director, CIFNET, a few days later consequent to the retirement of Dr. C.P. Verghese on super annuation, welcomed the gathering and highlighted the different activities of the Institute.

Dr. C.P.Verghese, Director, delivered the theme address on Sustainable Economic Management of the Deep-sea Fishing Sector in Indian EEZ. His address highlighted the various measures that could be implemented on a trial basis for the proper economic management

of the Indian deep-sea fishing vessels, for sustainable fish production.

Mr. P.Ramanujan, Chief Instructor (Craft & Gear) gave details in respect of the institution of awards and release of publications. Felicitations were offered by Prof.C.Hridayanathan, Dr. V.S. Somvanshi and Mr.M.P.John. Prof. C.Hridayanathan of CUSAT praised the close bondage between the Cochin

University and the Institute, particularly in respect of the expertise and assistance provided by CIFNET to the University in specialised areas. Dr.V.S.Somvanshi of FSI and Mr. M.P.John of MMD praised the yeomen services rendered by CIFNET in fishery training programmes at the international, national and regional levels. They also extended their full co-operation in the context of diversifica-

tion of training programmes envisaged by CIFNET.

Vote of thanks were proposed by Mr.C.Rethinadas, Chief Instructor (Marine Engineering).

The function was attended by Heads, Scientists and representatives of various fishery institutions and Departments and ex trainees of CIFNET in and around Kochi.



Mr. KANJIBHAI PATEL: GUJARAT'S NEW CABINET MINISTER FOR FISHERIES



Kanjibhai Patel

Mr. Kanjibhai Maganbhai Patel has assumed office as the Cabinet Minister for Fisheries in Gujarat, on 7th October, 2001, in the newly formed council of ministers under the leadership of Mr.Narendra Modi.

Hailing from an agriculturist tribal family of Bodvank in the Chilki Taluka of Valsad District, Mr.Patel has been a legislator from 1980 onwards. Earlier, he

was the Minister of State for Tribal Development, Minister for Panchayat, Tribal Development, Mines and till recently the Minister for Environment & Forests.

He has taken up the reins of the Fisheries Department at a time when the State Fisheries Sector passing through difficulties in view of:

- * The dangling threat of arrest and retention of Gujarati fishermen by the Pak Maritime Authorities in northern fishing grounds of the State, and

- * The mounting pressure on the South Gujarat Fishermen in Maharashtra to vacate the usage of New Ferry Wharf (Bhav Cha Dhakka) in Mumbai for their operations.

Mr.Patel's immediate concentration is to get the fishermen of Gujarat released from the Pakistani jails and at the same time identify alternate fish landing and

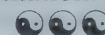
berthing facilities for the South Gujarat Fishermen. His initiatives have set in motion efforts to develop Dholai and Maroli in Valsad District as full-fledged fishing harbours.

There has been a considerable expansion of the fishing crafts in the State. The fishing fleet, which was 24,600 strong in 1997-98 has since increased to about 28,700 nos. in 2001. The existing fishing harbours, especially those at Veraval, Mangrol, Porbandar, Port Okha, Jakhao, are greatly congested calling for expansion of the facilities at these ports for landing, berthing, bunkering, etc.

Mr.Patel's immediate plans are to mitigate the difficulties of the fishermen through expanding/modernizing the existing fishing harbours and also developing new fishing harbours in the State.

Mr. Patel is known for his purposeful interactions with the officials and, technocrats and with him at the helm, the Fisheries Sector of Gujarat can hope for brighter days.

fish every 3.5 seconds. According to Optimar, the customer can document the freezing time of fish and trace it back to the catching vessel. The focus of the design is the high level of automation.



World's largest processing factory

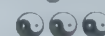
Faroe Seafood and Kloosterboer Group of the Netherlands are joining hands to establish the world's largest pelagic fish processing plant in Faroe Islands. The plant with a production capacity of 1 000 mt. per day is expected to process capelin, herring, mackerel and blue whiting mainly for the East European Far East and Nigerian markets which traditionally consume these pelagics. Other targeted markets are Egypt, Central America and the Philippines. Optimar, a Norwegian group, designed the entire

factory.

The factory will produce whole frozen fish, packed in cartons or vacuum bags depending on the market. The plant will have facilities for pumping the catch at the quayside at up to 120 mt an hour into the 800 mt storage tank, for channelising fish inside the factory, horizontal freezers and vacuum packing machines. The freezing system is designed in such a way as to make sure each freezer is ready to be for next use as soon as it has been emptied. It can handle 40 kg of

FAO grant for fisheries

Pakistan has received a grant of US\$258,000 from the Food and Agriculture Organisation to strengthen its fisheries sector. Under the Technical Cooperation Programme, the funds will be used in the areas of handling, processing and quality control.



Sea Food Safety : What Exporters must know about HACCP

P.K.Nanda and Sushil Kumar
Division of Livestock Products Technology
Indian Veterinary Research Institute
Izatnagar (U.P.) - 423 122

The sea-food industry plays an important role in the national economy and it has a substantial share in India's exports. Yet, there has been an increasing consumer and public perception that seafood is unsafe and needs more of regulatory and control measures. To counteract this, a preventive strategy based on thorough analysis of the prevailing conditions has been developed to provide greater safety at reduced cost. This strategy revolves round a study leading to control of all factors related to contamination, survival and growth of micro-organisms in food in all stages of the operation. The study is known as the Hazard Analysis Critical Control Point (HACCP) approach. This system can be used to control any area or point in the food system whether it be contaminants, pathogenic micro-organisms, physical objects, chemicals etc., that could contribute to a hazardous situation mainly during handling, processing, packaging and storage operations. Thus, Hazard Analysis Critical Control Point (HACCP) presents a good opportunity for the sea-food industry for upgrading quality bringing uniformity and consistency in the food supplies to international market. In general, it is a rational, objective and systematic approach for food safety management and a tool to assess hazards which focus on all aspects of food safety, minimizing the range of occurrence of hazards and reducing the risk of manufacturing and selling unsafe products.

The implementation of HACCP system must be done by a suitably balanced team, properly trained. A project leader should be appointed and he has to be involved in the development of the project plan so as to ensure its effective

management. The team should assess hazard types (i.e. microbial, chemical or physical) associated during harvesting of raw materials and ingredients, processing, manufacturing, marketing, preparation and consumption of food and determine the critical points required to control the identified hazards. Critical limits must be established at each identified critical control points. The system is to be followed by establishing procedures to monitor critical control points and corrective action to be taken when there is a deviation identified by monitoring procedures. Documentation concerning all procedures and records is required to prove that the system exists and is working well. Lastly an inbuilt verification procedure is to be established to ensure that the HACCP system is working correctly. Verification measures may include physical, chemical and sensory methods and when needed microbiological criteria also.

Risk assessment by Identification of Hazard(s): Potential hazard(s) associated with seafood products at all stages need to be identified along with information related to epidemiological data and microbiological knowledge to know the source of microbial hazard, raw material microbiology, organisms associated and introduced during handling/processing etc. Based on this, food products are categorised and preventive measures are identified for their control. These categories include physical hazards such as bone chips, glass, plastic, metal etc.; chemical hazards like natural and man-made and environmental hazards such as microbial testing for *Salmonella*, *E. coli*, Yeast, moulds etc.

Identification of critical control points : A critical control point/step/procedure/

operation aims at prevention of food safety hazards their elimination or reduction to an acceptable level. Failure to control hazards would most likely result in the production of a defective or unsafe food product. So, identifying contamination points and determining severity and probability of hazard occurrence are the main components of hazard analysis. Based on the severity of hazards, CCPs should be ranked.

Establishing the critical limits : After identifying Critical Control Points and ranking them, it is now for the HACCP team to set the appropriate critical limits after fully understanding the criteria governing safety at each CCP.

Monitoring: CCPs must be monitored to detect the loss of control at the CCP and to ensure that these are under control relative to its critical limits. It could be done by systematic observation(s) like visual, sensory, physical, chemical and microbiological means. The frequency of monitoring must be sufficient to ensure that the CCPs are under control, as monitoring provides information for corrective action to be taken to regain control over the Process, when there is any deviation from the scheduled line. Lastly, data derived must be evaluated by a designated person with knowledge to carry out corrective actions as and when needed.

Establishing corrective action: To bring the process back into control before the deviation leads to a Safety Hazard, corrective actions must be taken so as to ensure that the CCPs have been brought under control. These deviations and product disposition procedures must be documented in the HACCP record.

Record keeping and documentation : All

Sea-Food Inspection

HAZARDS	Place	Controls
Chemicals Toxins Pathogens Decomposition Parasites Physical objects	At the dock (incoming raw materia)	* Shipment documentation * Physical examinations * Laboratory tests * Hygiene and Sanitation
Pathogens Decomposition	Handling & storage	* Physical examination * Temp. and time monitoring * Laboratory tests * Hygiene and sanitation
Pathogens Decomposition Physical objects Chemicals Parasites	Processing and cooking Equipment	* Temp. and time monitoring Processing controls * Hygiene and sanitation
Pathogens Decomposition	packaging storage and delivery	* Temp. and time monitoring * Employee health * Date marking * Consumer advisories

* Specific to each sea-food product & processing operation.

Source: Muscle foods: Meat, Poultry and sea-food technology (1994); Kinsman *et al.*, (ed.); Chapman and Hall, New York, page 184.

records and documents such as HACCP plan, CCP monitoring records, training records, audit records, procedures related to HACCP systems etc. must be compiled and retained as written evidence and assembled in the shape of a manual, as these are useful in providing a basis for future reference purpose for analysis of data as well as for internal investigation of any food safety incidents, which may occur.

Establishing Verification Procedures : Verification procedure is to provide assurance that HACCP system is being complied with on day to day basis. This can be accomplished by analysis, monitoring and auditing methods, through various tests including random sampling to determine if the HACCP System is working correctly, or not. Further, auditing on monitoring procedures, record keeping systems and review of the records connected to CCPs are to be done to ensure the minimum required safety level.

A check list should be provided to the auditors to note any special observations or, evidences noticed, as this in turn will provide factual information for management decisions and will enable the effective monitoring and development of systems.

Future aspects : Further work in this regard is needed to fill the gaps in existing scientific knowledge so as to promote the consistent development and assessment of systems. This can be achieved through proper co-ordination, planning and partnership between industry, government and academicians. Above all, HACCP requires education and training, proper documentation and timely inspection to enhance the productivity in the industry. A review of the existing approaches and methods should be done and data collected from a variety of sources should be used to develop a prototype database. The cost of implementing HACCP and quality

programmes should be measured to assist in further development of the database.

Whether seafoods are to be produced and marketed in fresh, frozen or, in any other processed and packaged form, prevention of contamination is the most important aspect. The industry no doubt recognize this and has been taking adequate steps through HACCP, to counter the disastrous effects, which the contaminated poor quality products will have on the Gross National Product (GNP), in order to provide sufficient guarantee for an optimal product quality. ☺☺☺

Anti-cancer drugs from ma- rine organisms

Two teams of US researchers, with the assistance of the National Fisheries Institute (NFI), are developing anti-cancer drugs from marine organisms. Roy E. Martin, NFI's Science Advisor and former Vice President (Science and Technology) said that the benefits from marine organisms may one day prove to be a drug for cancer and may be useful for the entire human race.

The researchers at the University of Texas are working to synthesise Aplyronine A, a substance found in the sea hare, a variety of sea slug. Another project by the Stanford University is to synthesise production of Bryostatin, a compound from the bryozoan, a marine microorganism.

According to Christopher Widnell, Director, American Cancer Society, in programmes in drug development and molecular biology, both these compounds effectively compact cancer cells in the laboratory and the next step is to produce these compounds synthetically so that no damage is done to the marine environment. These compounds will be further tested first on mice, then on human beings. Both these projects are funded by NFI to the tune of US\$10,000 each under NFI's scholarship programme and the remaining US\$70,000 for each project, by the American Cancer Society. ☺☺☺

Predictable Profitable Performance

Broad Spectrum
Furazolidone Gel
Feed Supplement for
Aquaculture use.

FuraTec*Gel-FS

FuraTec*Gel-FS

For use in all mixed
problems of stress and
pond water problems of
Fish, Prawn and Shrimp.

Latest generation
Floroquinolone
anti-microbial
Feed Supplement Gel
for Aquaculture use.

PeflaCin*Gel-FS-Aqua

PeflaCin*Gel-FS-Aqua

Improves FCR, general
condition and survival rate of
Fish, Prawn and Shrimp
under different stress situations.

Concentrated live stabilized
microbial culture for use as
Direct Feed Microbial (Probiotic)
Feed Supplement for use in
Prawn and Shrimp Feeds.

SpectraLac-FS

SpectraLac-FS

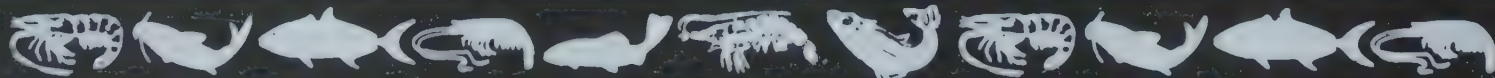
Stable in water. Regular use
helps improve feed conversion
ratio, increase weight gain
and prevents infections.

Unique Enzyme and Probiotic
feed supplement for use in
Prawn and Shrimp Feeds
for enhanced performance.

UltraZyme-P-FS

UltraZyme-P-FS

Facilitate feed digestion,
absorption and disease
prevention. Reduces wastes
and toxic substances in pond
caused by unconsumed
feed and excreta.



Neospark



NEOSPARK

Drugs and Chemicals Private Limited
241, B.L. Bagh, Panjagutta, Hyderabad - 500 082, A.P., India

* TRADE MARK : Tel : 091-040-3399351, 3396725. Fax : 091-040-3411806. E-mail : neospark@hd1.vsnl.net.in

For genuine O.S.I. Products contact

EAST COAST MARINE PRODUCTS AND SUPPLIES

"Parulika", 17, Dasapalla Hills,
Visakhapatnam- 530 003, A.P. India
Tel : 91- 891- 563982, 705425,
Fax : 91- 891- 567090
E-mail : bbdas@satyasaionline.net.in

16B, 2nd Floor
"SANTOSHAM" NO-33
Halls Road, Egmore
Chennai -600 008
TelePhone No: 9840209174

O.S.I.

RED JUNGLE BRAND

- ◆ Artemia of Hatch rate 90%, 80% and 70%
- ◆ Brine Shrimp Flakes in 454 grms cans and 5 kg. Buckets
(regular and superior quality)
- ◆ Spirulina Powder
- ◆ Black Algae Powder
- ◆ Artificial Plankton Rotifier
- ◆ American B.P.

(also available on wholesale rates and can facilitate direct import)

ARGENT LABS

- ◆ Antibiotics and chemicals

ALSO AVAILABLE

- ◆ Mesh Cloth (SEFAR, Switzerland)
- ◆ Air Stones (Imported)
- ◆ Sea Grass Powder (Imported)
- ◆ Sea Prince (Imported)

OUR STOCKS ARE ALSO AVAILABLE AT ONGOLE

S.R.S.Enterprises

No.8, I.S.R. Complex, Opp. Hotel Maurya,
Kurnool Road, Ongole - 523 002

Tel :08592 - 30923 / 28609. Cell : 98491 - 14557

THE REYKJAVIK CONFERENCE ON RESPONSIBLE FISHERIES IN MARINE ECOSYSTEM

Reykjavik, Iceland - 1-4 October 2001

The Reykjavik Conference on Responsible Fisheries in Marine Ecosystem was organised by the Government of Iceland jointly with FAO and Government of Norway. The Central theme of the Conference was an examination of the implications of the global trend towards ecosystem-based fisheries management (EBFM) for capture fisheries. It also aimed at facilitating an exchange of expectations and concerns between dif-

ferent interest groups and to provide an in-depth analysis of important global issues relating to fisheries, with particular emphasis on the implementation of Code of Conduct for Responsible Fisheries (CCRF).



L to R ~ K. Sujatha, M.R.K. Nair, and Sebastian Mathew

EBFM would help overcoming the limitations experienced in the conventional fishing management system. EBFM would provide a holistic, integrated and realistic approach to ensure strong stakeholder participation and a decentralised decision making structure.

The Conference was conducted in two parts - a scientific symposium in three sessions sandwiched by the main Conference and a plenary session on the

opening day and the second plenary session on the concluding day.

After the opening ceremony in the forenoon of 1st October, 2001, the first plenary session of the Conference was held. At the beginning of the Conference H.E.Mr.Arni M.Mathiesen, Minister of Fisheries of Iceland was elected as chair-

K. Sujatha with Alfredo, Minister for Fisheries, Mozambique

K. Sujata with A. Rosenberg of University of New Hampshire, USA

person of the Conference. Director General of FAO Dr.Jacques Diouf, H.E. Minister Otto Gregusson, Minister of Fisheries, Norway, and H.E. Mr. Haldor Asgrimsson, Minister of Foreign Affairs, Iceland, addressed the participants. Following the adoption of the agenda, six vice-chairpersons (who included the Ministers of Algeria and Vietnam) were elected. Mr. Michael Sinclair was elected as chairperson of the scientific symposium.

It has been established that the productivity of marine ecosystem is being affected by several factors such as fishing impact, marine pollution marine (including navigation and land based pollution) and coastal alterations. These impacts are likely to affect the sustainability of capture fisheries on which the livelihood of coastal fishing communities depend. Further, adverse impacts on productivity would lead to loss of economic opportunities. So far, the fisheries management which, is conventional, focussed only on fish stock. The proposed

opening day and the second plenary session on the concluding day.

The Conference was attended by representatives from 58 member countries of FAO and observers from 2 non-FAO member nations. Besides, representatives from United Nations, observers from 16 inter -governmental organisations, 10 international non-governmental Organisations attended the Conference. 67 participants also attended the conference as observers in their personal capacity.

There were three Indian delegates who participated in the Conference. These were: 1) Dr.M.R.K.Nair, Fisheries Development Commissioner, Government of India who participated as the official representative of FAO; 2) Dr.Sebastian Mathew, who participated on behalf of

the International Collective in Support of Fishworkers, with headquarters in Chennai; and 3) Prof.(Dr.)Kandula Sujatha, of the Department of Marine living resources of Andhra University.

At the First Plenary Session, five papers were presented. These were :

1) The Global Overview of Marine Capture fisheries, by Serge M. Garcia, and Ignacio Deleiva Moreno;

2) Obligations to Protect Marine Ecosystems under International Conven

tions and Other Legal Instruments, by Transform Aqorau;

3) Incorporating Ecosystem Considerations into Fisheries Management, by Bernt O. Bodal;

4) Small-scale Fisheries Perspectives on an Ecosystem-based Approach to Fisheries Management, by Sebastian Mathew;

5) An Environmentalist's Perspective on Responsible Fisheries: The need for Holistic Approaches, by Tundi Agardy;

The Scientific Symposium (including Poster) was conducted in three parts.

Session 1 was devoted to Dynamics of Marine Ecosystems, at which five papers were presented and discussed. These were:

1) Ecological Geography as Framework for a Transition toward Responsible Fishing by - Daniel Pauly, Reg Watson and Villy Christensen;

2) The Functioning of Marine Ecosystems by - Philippe Cury, Lynne Shannon and Yunne-Jai Shin;

3) Food Webs in the Ocean : Who Eats Who and How Much? by - Andrew W. Trites;

4) Competition for Food in the Ocean: Man and other apical Predators by - Tsutomu Tamura; and

5) Multi-Species and Ecosystem Models, by Gunnar Stefansson.

The subject of Session 2 was "The Role of Man in Marine Ecosystems"

Six papers were presented at this Session. These were:

1) Overview of Multiple Uses of Marine Ecosystems, by Andy A. Rosenberg;

2) Impacts of Fishing on Marine Benthic Habitats, by Michel J. Kaiser, Jeremy S. Collie, Stephen J. Hall, Simon Jennings, and Ian R. Poiner;

3) The Magnitude and Impact of By-Catch Mortality by Fishing Gear, by Robin Cook;

4) The Effects of Fishing on Species and Genetic Diversity, by Ellen

Kennington;

5) The Effects of Fishing on Non-target Species and Ecosystem Structure and Function, by Henrik Gislason;

6) Anthropogenically-induced Changes in the Environment: Effects on Fisheries, by Katherine Richardson.

The subject of the third session was 'Incorporating Ecosystem Considerations in Fisheries Management'. Five papers were presented at this session. These were:

1) The Performance of Fisheries Management Systems and the Ecosystem Challenge, by Jon G. Sutinen and Mark Sobol;

2) The Role of Harvest Control Laws, Risk and Uncertainty, and the Precautionary Approach in Ecosystem-based Management, by Doug S. Butterworth and Andre E. Punt;

3) Modifying Fishing Gears to Achieve Ecosystem Objectives, by John Willy Valdemarsen and Petri Suuronen;

4) Incorporating Ecosystem Objectives into Management of Sustainable Marine Fisheries, including "Best Practice" Reference Points and the Use of Marine Protected Areas, by Keith Sainsbury and Ussif Rashid Swmaila;

5) On Governance for Responsible Fisheries : An Ecosystem Approach, by Michael P. Sissenwine and Pamela M. Mace.

The presentation of Views of the Industry and NGO representatives in the form of Statements and Panel Debate followed.

After the first plenary session, a drafting committee set up under the chairmanship of H.E. Mr. Abroham Iyambo, Minister for Fisheries, Namibia, drafted the Reykjavik Declaration. All FAO members were represented in the drafting committee.

At the Second Plenary Session the Framework for future action was considered.

Country Statements were made on the subject "Towards Ecosystem-based

Fisheries Management".

As already mentioned, Sebastian Mathew, Executive Secretary, International Collective in Support of Fishworkers, Chennai, India made a presentation on "small scale fisheries perspectives on an eco-systems-based approaches to fisheries management". This is reproduced hereunder:

"In 1992, UNCED Agenda 21 highlighted the protection and preservation of highly diverse marine ecosystems and the problems that degraded ecosystems posed to marine fishing activities. The 1995 UN Fish Stocks Agreement referred to the need to maintain the integrity of ecosystems and to consider problems posed by fishing and by degrading ecosystems. Further, the 1995 FAO Code of Conduct for Responsible Fisheries gave greater significance to an ecosystem-based approach to fisheries management.

Artisanal and small-scale fisheries are accorded special recognition by the Code of Conduct for Responsible Fisheries, and it is in fact the only fisheries sub-sector specifically mentioned in the Code. It contributed more than a quarter of world catch, and accounted for half of the fish used for direct human consumption.

Individually, small-scale fishing units are less threatening to the marine ecosystem than are large-scale ones, because they participate in a multi-species fishery with low quantities of gear that are often passive and selective, and in accordance with the fisheries resources that are reasonably accessible to their gear.

With the widespread adoption of motorization, small-scale fisheries have grown significantly over the past two decades. The rapid expansion of artisanal fishing capacity under open access regimes has begun to exert overfishing pressures on coastal fisheries resources, especially in Asia and Africa. There are increasing conflicts between different gear groups as a result of increased mobility of fishing vessels, capacity expansion and overfishing pressures.

In the present scenario, there is an urgent need for the State to take up fish-

eries management measures for greater equity and sustainability through consultative mechanisms. In this context, greater recognition should be given to small-scale rather than large-scale fisheries. The emphasis has to change from increasing fish production, toward conservation and management goals.

To initiate fisheries management measures in developing countries, a "cross-word" approach could be considered, i.e., filling up management niches that are relatively easy at first, and then moving to more difficult ones with the aid of early breakthroughs or solutions.

There could also be global initiatives towards fisheries management in developing countries. Industrialized countries, in the first place, should not transfer their excess fishing capacity to developing countries. There is also a need to establish a well-designed, time-bound, international aid programme in exchange for a commitment to manage fisheries in a consultative, transparent and sustainable manner.

For small-scale fisheries that are overcrowded in developing countries, industrialized nations could contribute to alleviating such demographic pressure in fisheries by facilitating temporary migration of surplus labour into their fisheries, particularly into fisheries that are earmarked by labour shortage.

Concurrent with proposing and implementing measures that basically address the impact of fishing on fish stocks and the marine habitat, there is also need for measures to minimize the effect of pollution-related habitat degradation on fish stocks, and to better understand the intricacies of weather and climate factors. Programmes to conserve "charismatic" species like sea lions, dolphins and sea turtles also sometimes become counter-productive when these resources multiply in large number and compete with fishers for the quarry, without significantly contributing to the health of the marine ecosystem.

Unlike the single-species model in fisheries management, which is by far the most prominent model in most parts of the world, an ecosystem-based approach

to fishery management could be an effective tool in developing countries since it could take into account the complexity of the marine and coastal ecosystems.

A universally acceptable definition of ecosystem-based fishery management, however, has to consider fishers as part of the ecosystem, which is an important consideration for developing countries that have 95 per cent of the world's fisher population and over 60 per cent of the world's marine fisheries resources.

An ecosystem approach has to be used in a dialectical sense. It should, on the one hand, take into account the effects of fishing on fish stocks, especially the unequal impact of small-scale and large-scale fishing on targeted fish stocks and the marine and coastal ecosystems, undertaken under different economic, social and political milieu. On the other hand, it should also take into account the effects of marine ecosystems, and alternative livelihoods for fishers. This would be within the framework of what could be considered as an ecosystem-based approach to fisheries management indicated in Agenda 21 and the UN Fish Stocks Agreement."

K. Sujatha, who was chosen as one of the Scientific Advisors for the co-ordination of the various presentations made by the scientists who participated in the Conference, presented a paper entitled 'Impact of shrimp trawling on fin-fish resources of the East Coast of India.

Japan abstained from the second plenary session in which the declaration was adopted, protesting exclusion of the clauses related to marine mammals. The Reykjavik declaration essentially sought to re-affirm the commitments of the states to earnestly implement the Code of Conduct for Responsible fisheries (CCRF) incorporating therein the ecosystem considerations for achieving a greater degree of sustainability. The text of the declaration, finally read and adopted at the end of the session on the 4th October, is reproduced here under.

Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem

"Having met at the Reykjavik Con-

ference on Responsible Fisheries in the Marine Ecosystem from 1 to 4 October 2001,

Appreciating the initiative taken by the Government of Iceland and the Food and Agriculture Organization of the United Nations (FAO) to organize the Conference with the co-sponsorship of the Government of Norway,

Recalling that this initiative was endorsed at the Twenty-fourth Session of the FAO Committee on Fisheries (26 February -2 March 2001) and at the One Hundred and Twentieth Session of the FAO Council (June 2001),

Recalling that the 1982 United Nations Convention on the Law of the Sea (the Convention) sets out the rights and duties of States with respect to the use and conservation of the ocean and its resources, including the conservation and management of living marine resources,

Recalling that in recent years the world community has agreed on several additional legal and political commitments that supplement the provisions of the Convention, including the Rio Declaration on Environment and Development and Agenda 21 (Chapter 17),

Reaffirming the principles of the FAO Code of Conduct for Responsible Fisheries,

Recalling further the four International Plans of Action formulated in accordance with the Code of Conduct, namely for the Management of Fishing Capacity, for the Conservation and Management of Sharks, for Reducing Incidental Catch of Seabirds in Longline Fisheries, and to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing,

Reaffirming that the FAO Council during its One Hundred and Twentieth Session recommended that ecosystem-based fisheries management studies to be conducted by FAO, as agreed in paragraph 39 of the Report at the Twenty-fourth Session of the FAO Committee on Fisheries, should be balanced and holistic in approach,

Welcoming and taking into account

the discussion in the scientific symposium of the Conference,

Recognising that sustainable fisheries management incorporating ecosystem considerations entails taking into account the impact of fisheries on the marine ecosystem and the impacts of the marine ecosystem on fisheries,

Confirming that the objective of including ecosystem considerations in fisheries management is to contribute to long-term food security and to human development and to assure the effective conservation and sustainable use of the ecosystem and its resources,

Appreciating that the Conference represented an important opportunity for all fisheries stakeholders to jointly assess the means for including ecosystem considerations in fisheries management,

Aware that the sustainable use of living marine resources contributes substantially to human food security, as well as dietary variety, provides for the livelihood of millions of people and is a central pillar of many national economies, especially low-income food deficit countries and small island developing States,

Recognising the complex inter-relationship between fisheries and other components of the marine ecosystems, and fisheries management organizations would enhance management performance,

Affirming that incorporation of ecosystem considerations implies more effective conservation of the ecosystem and sustainable use and an increased attention to interactions, such as predator-prey relationships, among different stocks and species of living marine resources; furthermore that it entails an understanding of the impact of human activities on the ecosystem, including the possible structural distortions they can cause in the ecosystem,

Recognising the need to strengthen and sustain management capacity, including scientific, legal and institutional frameworks with the aim of incorporating among other things ecosystem considerations,

Emphasising that the scientific basis for including ecosystem considerations in fisheries management needs further development and that there is incomplete scientific knowledge about the structure, functioning, components and properties of the ecosystem as well as about the ecological impact of fishing,

Recognising that certain non-fishery activities have an impact on the marine ecosystem and have consequences for management. These include land-based activities which affect habitat, water quality, fisheries productivity, and food quality and safety,

Recognising also that the majority of developing countries face major challenges in incorporating ecosystem considerations into fisheries management and that international cooperation and support are necessary.

Declare that, in an effort to reinforce responsible and sustainable fisheries in the marine ecosystem, we will individually and collectively work on incorporating ecosystem considerations into that management to that aim.

Towards this end, we further declare:

1. Our determination to continue effective implementation of the FAO Code of Conduct, which is our common and agreed guide in strengthening and building fisheries management systems, as well as the International Plans of Action as formulated in accordance with the Code, and the Kyoto Declaration on the Contribution of Fisheries to Food Security.

2. There is a clear need to introduce immediately effective management plans with incentives that encourage responsible fisheries and sustainable use of marine ecosystems, including mechanisms for reducing excessive fishing efforts to sustainable levels.

3. It is important to strengthen, improve and where appropriate establish, regional and international fisheries management organizations and incorporate in their work ecosystem considerations and improve cooperation between those bodies and regional bodies in charge of

managing and conserving the marine environment.

4. Prevention of adverse effects of non-fisheries activities on the marine ecosystems and fisheries requires action by relevant authorities and other stakeholders.

5. While it is necessary to take immediate action to address particularly urgent problems on the basis of the precautionary approach, it is important to advance the scientific basis for incorporating ecosystem considerations, building on existing and future available scientific knowledge. Towards this end we will undertake to:

(a) advance the scientific basis for developing and implementing management strategies that incorporate ecosystem considerations and which will ensure sustainable yields while conserving stocks and maintaining the integrity of ecosystems and habitats on which they depend;

(b) identify and describe the structure, components and functioning of relevant marine ecosystems diet composition and food webs, species interactions and predator-prey relationship, the role of habitat and the biological, physical and oceanographic factors affecting ecosystem stability and resilience;

(c) build or enhance systematic monitoring of natural variability and its relations to ecosystem productivity;

(d) improve the monitoring of by-catch and discards in all fisheries to obtain better knowledge of the amount of fish actually taken;

(e) support research and technology developments of fishing gear and practices to improve gear selectivity and reduce adverse impacts of fishing practices on habitat and biological diversity;

(f) assess adverse human impacts of non-fisheries activities on the marine environment as well as the consequences of these impacts for sustainable use.

6. The interaction between aquaculture development in the marine environment and capture fisheries should be

monitored through relevant institutional and regulatory arrangements.

7. Our determination to strengthen international cooperation with the aim of supporting developing countries in incorporating ecosystem considerations into fisheries management, in particular in building their expertise through education and training for collecting and processing the biological, oceanographic, ecological and fisheries data needed for designing, implementing and upgrading management strategies.

8. We resolve to improve the enabling environment by encouraging technology transfer contributing to sustainable man-

agement where appropriate, introducing sound regulatory frameworks, examining and where necessary removing trade distortions, and promoting transparency.

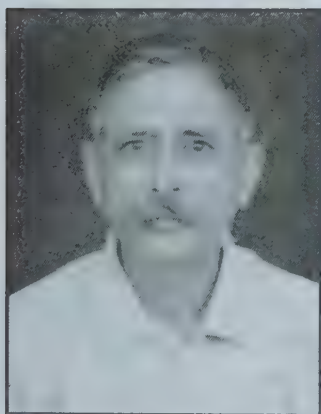
9. We urge relevant technical and financial international organisations and the FAO to cooperate in providing States with access to technical advice and information about effective management regimes and about the experience from such arrangements, and other support, devoting special attention to developing countries.

10. We would encourage FAO to work with scientific and technical experts from all different regions to develop

technical guidelines for best practices with regard to introducing ecosystem considerations into fisheries management. These technical guidelines should be presented at the next session of the FAO Committee on Fisheries.

AND REQUEST that the Government of Iceland convey this Declaration to the Secretary-General of the United Nations, the Director-General of the Food and Agriculture Organization of the United Nations, the Chairman of the World Summit on Sustainable Development to be held in Johannesburg in September 2002 and relevant fisheries management organizations for their consideration.

D.Kapoor takes over as Director, NBFGFR from A.G.Ponniah *Ponniah moves over to ICLARM*



D. Kapoor

Dr. Dhurendra Kapoor, Head of the Fish Conservation Management Division of National Bureau of Fish Genetic Resources, has taken over as Director, National Bureau of Fish Genetic Resources, Lucknow on 29.11.2001 from Dr. A.G. Ponniah, who has joined ICLARM, Malaysia, as Programme Leader of its Biodiversity and Resources Programme.

D. Kapoor did his B.Sc. in 1964 from Agra University and M.Sc. from Kanpur University in 1967, and was awarded Ph.D. degree from Kanpur University in 1991 for his pioneering work on aquatic toxicology. He served as Lecturer at Jai Narain Degree College, Lucknow (1967-68) and thereafter at Defence Research Laboratory, Kanpur (1968-72). Later, he served Allahabad Research Centre of Central Inland Fisheries Research Institute in various scientific positions, before joining as Senior Scientist at National Bureau of Fish Genetic Resources, Allahabad in August 1985. In August 1998 he was elevated to the position of Principal Scientist at the Bureau.

Kapoor has contributed significantly in the field of aquatic toxicology, fish genetics, induced breeding and ichthyobiodiversity conservation. He was the first person in India who visualised the concept of cataloguing the total germ plasm resources of India. He has also developed database for the entire fish genetic resources inhabiting different ecosystems of the country. He received advanced training in fish genetics and germplasm conservation at Prof. J.A. Breadmore Laboratory of School of Biological Sciences, Swansea (United Kingdom) during 1988-89 under British Council Programme. Kapoor also visited several laboratories involved in fishery research and allied subjects in France and USA. During 1992, Kapoor identified 79 threatened fishes from the Indian subcontinent and delineated measures to conserve them for sustainable aquaproduction.

Fishery Development in Haryana's Saline zone: Australian Team at work

At the initiative of ICAR, an Australian team of two scientists is understood to have made a field study of the potential and scope for the development of culture fisheries in the vast saline zone of Haryana, particularly Sultanpur and Rohtak areas and also in Ludhiana zone of Punjab.

C.P. Verghese Retires

Dr. C.P. Verghese, Director, Central Institute of Fisheries Nautical engineering and Training, Cochin, retired from service on superannuation on 30 November 2001. Mr. M.K. Devraj, Deputy Director, CIFNET Unit, Visakhapatnam, has taken over as in-charge Director of CIFNET, Cochin. He will, however, continue to hold charge as Deputy Director, CIFNET Unit at Visakhapatnam, and also as Deputy Director, Integrated Fisheries project's unit at Visakhapatnam.

Indian Tuna Pilot Project

It is understood that installation work related to the Indian tuna pilot project, initiated by AIFI and being implemented by MPEDA, for equipping two shrimp trawlers with tuna longlining equipment, will commence in January 2002.

Andhra Pradesh Newsletter

From : K.Simhachalam

**Shrimp Aquaculture
at Cross-roads**

Shrimp aquaculture along the coast of Andhra Pradesh made major strides in the last ten years. As at the end of 2000-2001, it is estimated that 71,000 ha of area in the coastal zone has been brought under shrimp aquaculture, with an annual production of 53,100 t. The production would have been probably much more but for the fact that the cultured shrimp suffered from the misfortune of attack by whiltspot virus. Since then, the disease has been recurring often and on, causing misery and losses to fish farmers.

This year (2001), because of unusually heavy rains and prevalence cyclonic conditions during monsoon season, there was a sudden drop in temperature of pond waters, which, according to the farmers, was mainly responsible for the widespread whitespot disease attack. The farmers claim that, despite the fact that they maintained the water conditions of the ponds well, the disease struck. So much so, they experienced heavy losses. On the top of substantial loss of shrimp crops sustained by most of the farmers, they had the misfortune of a drop in shrimp prices, partly attributed to 11th September attack by terrorists in New York and Washington. The prices of shrimp at pond side fell to Rs.250/- per kg, which never happened before. Apart from the effects of the terrorists attacks in U.S.A., it is stated that the accumulation of shrimp stocks in warehouses in Japan and U.S.A led to plummeting of shrimp prices. However, the prices have somewhat recovered but this took place after the culture cycle was over and the farmers sold the harvest. There is also an allegation that the middle men who are in the business of shrimp procurement from farmers formed into a syndicate and brought down the procurement prices. This allegation is strongly refuted by those in shrimp purchase activity. In this situation, farmers have ap-

pealed to the Government to take measures to help them by formulating and implementing helpline measures, whenever such situations of procurement prices falling below production costs. Measures such as granting of subsidies, announcement of support prices were suggested by them.

**World Fisheries
Day Celebrations:
23rd November
2001**

The World Fisheries Day was celebrated at Kakinada on 23-11-2001 at a function presided over by Mr. V. Venkateswara Rao, M.L.A. Mr. Ch. Ramachandra Rao, Minister for Cooperation, Government of Andhra Pradesh addressed the fishermen who gathered in large numbers to celebrate the event.

The Minister told the participating fishermen that a welfare scheme with an outlay of Rs.6.50 crores, to be financed by Andhra Pradesh Cooperative Bank, would soon be made operational for the welfare of fishermen. Under the scheme 3500 houses would be constructed and allotted to poor fishermen. He also mentioned that the Government formulated a 10 crore project to help the victims of recent cyclone that ravaged the coast and also inland areas adjacent to the coast.

The Minister assured the fisher community that the Government would take steps to streamline the fishery lease system in respect of village tank fisheries so as to ensure that the Fishermen's Cooperatives are benefited. He exhorted the participants to send their children to schools, mentioning that, that was the only way to remove backwardness in the fishing community on an enduring basis. It was also mentioned that education would lead to better awareness among them, in course of time, to improve socio economic conditions.

V. Venkateswara Rao said that Rs. one crore was released by the Government for supply of boats and nets to fisher-

men. He also mentioned that the grant being given to a fisherman for a house has also been increased from Rs.20,000 to Rs.40,000. He also told the participants that he would bring to the notice of the Government the need to provide VHF sets to the sea going fishermen to enable them to be in communication with the shore centres in times of cyclonic weather or when sudden accidents took place while out at sea etc.

Mr. B. Ranga Rao, President, District Fishermen's Cooperative Society, appealed to the Minister to provide the facility of loans to fishermen's society by APCOB for the purchase of boats, nets and VHF sets.

Mr. D. Krishniah, Regional Deputy Director of Fisheries, Kakinada, and Mr. K. Seetharama Raju, Assistant Director of Fisheries, Kakinada, also participated.

**Educate your Children: Mr. G.M.C.
Balayogi**

Lok Sabha speaker, Mr. Balayogi, exhorted the fisher community to educate their children so as to ensure the development of the community, in his address after inaugurating the Backward classes Residential School at Amalapuram. He also emphasized the need to develop the coastal areas of Andhra Pradesh in such a manner that after-effects of natural calamities such as cyclones to which the Bay of Bengal coastal zone became subject to every year could be effectively countered. He told the participants that all fishermen should strive to work unitedly for the development of their respective villages taking advantage of the benefits provided by the Government. The participants were happy when he told them that the Government released Rs.11.89 crores for the rehabilitation of fishermen and another Rs.9.85 crores had been allocated to provide relief to 4,518 cyclone victims. Another aspect mentioned by him was the coastal areas along the State would be developed as tourists

spots. This step would lead to improvement of economy of the coastal population.

Observing that the government would soon distribute fishing craft and tackle worth Rs.3.95 cores among fishermen, he said that Government had introduced insurance risk coverage schemes for them. It was mentioned that the amount payable to a fisherman affected in fishing operations had been increased from Rs.35,000 to Rs.50,000. It was also mentioned that grant in respect of houses to fishermen had been raised from Rs.20,000 to 40,000 per unit.

Mr. Chikkala Ramachandra Rao, speaking on the occasion, said that 6,000 buildings had been constructed along Andhra Pradesh coast under the KFW project launched in association the

Government of Germany. He mentioned that residential schools would be given priority in the allotment of these buildings. The District Collector of East Godavari District, Mr. Satish Chandra said that Government would come forward to set up schools in such of the fishing villages that need them.

Export Inspection Agency's Office in Bhimavaram

Preparations are in full swing for the setting up of an office of Export Inspection Agency (EIA) at Bhimavaram. The Agency has decided to set up this office, taking into account that Bhimavaram has emerged as an important centre for the export of cultured shrimps raised in a vast area along central coastal districts. It is stated that centre would run under

the purview of the Central Trade Agency which became operational effective from 5-8-2001.

It is stated that the Agency's unit at Bhimavaram would be equipped with a Research Centre, to be set up at a cost of Rs. one crore. A Deputy Director, would be appointed to run the Agency. The shrimp farmers and exporters are happy at the development as all formalities of inspection related to export could be completed at Bhimavaram itself, instead of going to Centres at distant places as at present. The fishermen are also happy that they would get water and soil of their ponds tested at the research centre to be set up as part of the Agency and that they can have the shrimp post-larvae tested before stocking, at the research centre to be established. ☺☺☺

SEFAR'S Products (Net cages, plankton nets etc)

SEFAR, Switzerland produces high quality sieving and filter fabrics and products for all aquaculture applications.

The SEFAR fabric programme includes supply of precision sieves of different material strengths with a mesh grading between 5000 and 5 microns. This range of sieves therefore fulfils all requirements of sieves of today's aquac-

culture and hydrological needs. Appropriate sieving fabrics are offered in terms of per running meter and as standard or customised products, such as plankton nets, net cages, landing nets, dip nets, and control sieves.

With appropriately designed plankton nets, harvests of enormous quantities of plankton per day can be achieved for feeding various developmental stages of fish. Further, it is stated that, with SEFAR's wide range of sieving fabrics,

plankton can be perfectly graded. The result is the availability of plankton of needed size for feeding various development stages of fish larvae and fry.

The high quality sieving fabrics from SEFAR, Switzerland with perfect pore opening and with high durability, are now available in India through Ligdag Marketing Pvt.Ltd, Pune. Customers can contact Ligdag on Phone 020 528 0508 Fax 020 528 0365. E mail address is "logis@ip.eth.net" ☺☺☺

SCHEME FOR DISTRIBUTION OF INSULATED FISH BOXES AT SUBSIDISED COST

The Marine Products Export Development Authority has decided to enhance the value-wise ceiling of subsidy for insulated fish boxes (Purchased after 5/5/2001), as detailed below :

Category/beneficiary	Maximim subsidy(Rs.)
Small mechanised boat/country craft (less than 32 ft. OAL)	4,500
Mechanised boat	15,000
Peeling shed/pre-processing centre	50,000
Processing plant	1,00,000
Shrimp farmers 5 ha. and less	35,000
Shrimp farmers above 5 ha.	50,000

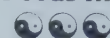
It may be noted that the above enhancement on value-wise ceiling will be applicable only to insulated fish boxes purchased after 5/5/2001. ☺☺☺

LIST OF ADVERTISERS

Devi Sea Foods Ltd	04
East Coast Marine Products and Supplies	45
Garware Wall Ropes Ltd	32
G.K. Marines Ltd (Nan Rong)	16
Ligdag Marketing Pvt Ltd.....	29
MPEDA	59
Neospark	11 & 44
O.S.I.....	60
Orbit International	01
Oxyflow	30 & 31
Southern India Aquaculture.....	06

Cover Positions

Nekkanti Sea Foods Ltd	I
C.P. Aquaculture (India) Ltd	II
Gold Mohur Foods & Feeds Ltd --	III
Higashimaru Feeds India Ltd	IV



ORISSA NEWSLETTER

From : H.S.Badapanda

**Soil Erosion Endangers
Paradeep Fishing
Harbour**

In 1982, due to cyclone and flood the course of the river Mahandi changed slightly resulting in heavy soil erosion. After some years both the banks of the estuary were damaged due to flooding. The conditions were checked by construction of 'SPUR' at the river mouth. However, recent flooding has caused severe soil erosion again at the mouth endangering the longevity of Paradeep fishing harbour which was recently built at a cost of Rs.38 crores. This erosion line is slowly approaching the canteen point and may extend further, which may cause damage to the fishing harbour, as feared by the fishing communities and the commercial units associated with the harbour. The Port Authority has constructed 'SPUR' along the mouth of the river which is very near to the harbour. It is now proposed that the construction of 'SPUR' may be extended to avoid future damage to the harbour.

**High Level Meeting on
Hirakud Reservoir
Fisheries**

A high level meeting was held in the conference hall of the Mahanadi club, Sambalpur on 23.11.2001 to decide on the methodology to be followed to increase fish production in the Hirakud Reservoir. Mr. T.Ramchandru, Revenue Divisional Commissioner (ND), Sambalpur presided over the meeting. It is indicated that the reservoir could produce 234.632 mt. of fish during the year 2000-2001. During 2001-2002 till October, 2001 the production has been as low as 87.336 mt. Compared to the fish landings from the reservoir 483.0 mt (1986-87) and 489.5 mt. (1991-91) the catches have been coming down year by year. Observations on fish landings from Hirakud reservoir, which was impounded in the year 1957, have revealed that most of the prime carps have established in the reservoir having be-

come acclimatized to the impounded water environment. This being the case, the reason for such poor catch can be attributed mainly not to the absence of a systematic conservation policy. Lack of conservation is believed to have resulted in mass and unscrupulous killings of millions of juveniles during the post-breeding season and a large number of broodstock in the breeding season. The reservoir has been divided into six sectors out of which five sectors have been leased out to five primary fishermen's co-operative societies, namely Lakhanpur, Themra, Lanchhipali, Tamdei etc., without any regulatory measures for conservation or declaring certain zones as 'fish sanctuary' till to-day. This point was highlighted at the meeting for the attention of the concerned officials associated with the activities of the reservoirs. The Deputy Director of Fisheries (NZ), Sambalpur, two scientists of CIFT, Burla; District Magistrate of Sambalpur, Jharsuguda, Bargarh and other officials attended the meeting and took part in the deliberations.

**Low Fish Production
Resented**

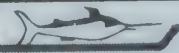
Orissa, once known as the land of forest and fish unfortunately is heading towards a land of no-forest or fish due to wrong policies being adopted at present. So far as fish is concerned, Orissa now depends almost on the supply of fish from Andhra Pradesh. Fish worth around Rs.50 lakhs arrive daily in Orissa from A.P.

Though the State has availed of a loan of Rs.1080 million from the World Bank under different schemes for development of fisheries, with posting of technical staff at all dist and block levels the main objective for maximum utilisation of water resources for fish production has not been so far achieved. Calamities like super cyclone (October 1999) and excessive flooding have been no doubt the

major constraints for fish production during last 2-3 years but there can be no excuse for low production which should have been commensurate with the water area utilised both in reservoir and pond culture sectors. As per reports, the freshwater fish production in 1998-99 was about 1.45 lakh mt. but in 1999-2000 it came down to 1.25 lakhs mt. The production of fish in 2000-2001 was also not satisfactory. Therefore effective steps need to be initiated on top priority to increase fish production by augmenting available water resources so as to at least meet the internal demand totally, and to check the flow of funds outside the State for meeting the cost of imports from A.P.

**Emphasis To In-
crease Marine
Catch**

Mr. B. Harichandan, Minister for Revenue and Animal Resource Deptt., Orissa has emphasised an increase of marine fish catch in the State at a high level meeting held in the conference hall of Orissa Secretariat. Mr.S.N.Nayak, Minister (Panchayati Raj); Mr. B.Rautrai, Minister, (culture), Mr. Sanjeeb Ch.Hota, Agricultural Production Commissioner, Mr.S.Vasudevan, Transport Commissioner; Mr.Damodar Rout, MLA with Mr.Umesh Swain and Mr.J.P.Das attended the meeting. A review had shown that there were 3643 small trawlers and 1680 boats fitted with outboard engines operating in the coastal waters of the State consuming of diesel worth 1200 millions of rupees annually. It was indicated at the meeting that due to restrictions imposed for fishing in the inshore waters the trawlers were operating in deep waters, facing high fuel expenses. For this reason, they approached the government to waive sale tax levied on the fuel. It was also noted that due to siltation in most river mouths the fish catch had come down drastically. This required dredging of the mouths of rivers for which they requested to government to move Govt.



of India for assistance. They alleged also that due to non-existence of sufficient cold storage space on the coastal belt it had become a problem to preserve the catches. It was agreed at the meeting to move NABARD or APICOL for assistance to promote construction of such infrastructures.

It was also felt necessary to ban capture of shrimp juveniles in the coastal waters. Concern was expressed over non-payment of compensation to most of the fishermen who lost their boats and nets and trawlers during the super cyclone - 1999.

Fishermen's Concern For Low Fish Catch

A report from Sonapur indicates that the main food items of people in the area is rice and fish. This situation resulted in fishing in Mahanadi as the major profession of fishermen in the area. A cursory survey indicates that there are about 15,000-20,000 fisher families who reside in the villages located on the bank of this river and totally dependant upon fishing. Moreover, for the past 10-12 years fish catches in the river stretch and its tributary Tel have gone down. It is alleged that most of the fishing is done by dynamiting which has harmed fish population. There were proposals to release fingerlings on a large scale in these rivers but as it is felt that this will be useful when proper conservation measures are implemented.

Sonapur is situated at the confluence point of the river Mahanadi and the river Tel. Both these rivers are perennial. Major carps and cat fishes take shelter and grow in the adjoining riverpool of the town. 5-6 years back the prime freshwater prawn, (*Macrobrachium malcolmsonii*) was available in plenty from this pool. But the situation has totally changed now. There is a primary fishermen's co-operative society at Sonapur. Whose members indulge in ruthless killing of juveniles as well as brooders taking shelter. The population of fish in the river can be augmented if conservation measures like mesh size

regulation/ ban on juvenile killings/ban on fishing by dynamiting are initiated and implemented with determination. Such a step will increase fish population and will help sustenance of the poor fishing communities residing on the bank of both these rivers.

Steps For Development of Ansupa Lake

On 1.10.2001 a meeting was held in presence of Mr. Debi Prasad Mishra, Minister of State (Health) and Mr. Ranendra Pratap Swain, Minister (Sports), Orissa to decide upon strategy for renovation and development of 'ANSUPA' the biggest freshwater lake of Eastern India. Mr. B. Rautrai, Minister (Culture), Orissa, Mr. D. P. Bagchi, Chief Secretary, Orissa; Mr. S. Rath, Secretary Tourism, and Mr. Balakrishnan etc. attended the meeting. It was indicated at the meeting that it was decided earlier that the Deptt. of Revenue, would prepare a project report for renovation and development of the lake within a month but the same had not been so far prepared and submitted to the Lake Development Committee. It was, therefore, decided to form a Committee for its Development on the lines of Chilka Development Authority, with the stipulation that it should simultaneously take steps to declare the lake's area as a bird sanctuary. Simultaneous steps might also be taken for its renovation. Noting that the lake is famous for its freshwater fish, it was felt that this needed to be kept in view in the developmental process.

Poor Assistance for Cyclone Victims

A report from Balasore indicates that no concrete steps have been taken so far for providing adequate assistance to fishermen who lost their nets, boats during the super cyclone (1999). A total amount of 61.89 lakhs was said to have been paid so far but the payments had been made to persons who were influential and those that suffered less in the cyclone. Mr. Damodar Das and Mr. Parsuram Behera led a unit of fishermen to the Collectorate, Balasore and complained against such injustice. The matter was also brought

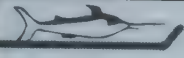
to the notice of the M.P. of Balasore, with an appeal to identify the real victims of the cyclone and extend such assistance only to them. The Collector promised to enquire into the matter through the Asst. Director of Fisheries (Marine), Balasore, to take remedial measures in future.

News in Brief

(a) *Problem of myanmar fishermen* : Last year 39 fishermen of Myanmar were caught by the Coast Guard and jailed for unauthorised fishing in Indian waters. These fishermen have been released by the Hon'ble Court in the mean time. The Collector, Jagatisinghpur reported the facts to the State Govt. as well as to the Ministry of External Affairs and Ministry of Home Affairs, Govt. of India. Due to alleged lack of interest on the part of the Embassy of Myanmar in India these fishermen are in acute mental imbalance and unable to move from India to their mother land.

(b) *Achievements galore* : Kalahandi district is known for its vast water resources potential for fish culture. During 2001-2002, till date, due to good rainfall and sincerity of staff, the district has been able to produce 381 lakhs of carp spawn and distribute 61 lakhs of fry against a target of 61.0 lakhs and 60 lakhs respectively. Out of 381 lakhs of spawn the contribution of catla was 144 lakhs. There are 7 Govt. fish farms in the district effectively managed by the Asst. Director of Fisheries of the district, with his sincere staff.

(c) *Heavy Hilsa Catch* : This year there was heavy hilsa catch off Balasore coast. The reason for such large scale catch was good rainfall in Northern Orissa. The run off merging to the sea created conducive environment for large scale hilsa migration from the sea to the freshwater river stretches. However, this harvest created law and order problem in many of the coastal points. In some places the catches were sold just at a nominal price and at other places the catch was forcibly taken away by miscreants. ☹☹



TAMIL NADU NEWSLETTER

From : R.Jayaraman

Govt ban on shark fishing causes utter chaos among fishermen

More than 10,000 fishermen from all over the country will stage an agitation in front of the Parliament to protest against the Union government's ban on fishing for sharks and certain other specific varieties of fish.

Addressing a press conference, the Mechanized Boat Fishermen's Association President P.Kuppan alleged that the government's decision was taken to protect the interests of big exporters of shark meat.

A notification by the Environment Ministry of the Central government on July 11 banned fishing of sharks, rays, sea horses and giant grouper etc., with relevant amendments to be incorporated into the Wildlife Protection Act, 1972. The ban imposed on fishing of 54 varieties of sharks and 52 varieties of conches, eel and sea cucumber by the union government is impracticable and it would bring hardships to many a fisherman. The fishermen in the State had already proposed to fight out the ban tooth and nail.

V.Venkatesan, former Director, Marine Products Export Development Authority was reported as having opined that there was no basis for the government for slapping the ban as the total shark caught from the Indian seas accounted for about 3 % of the total catch of marine fish in the country. While there was potential to catch 1,70,000 sharks, the average level of sharks caught was about 70,000 only. According to him even this was not done in an organized manner and therefore there was no threat for the extinction of the sharks species except perhaps off Gujarat where whale shark had been hunted for near extinction.

The fishermen in Tamil Nadu were not using any specific nets to catch sharks but they were getting caught in the gillnet used to catch other species of fish. Hence he felt that in the present situation the fishermen either have to throw back the dead shark back into the sea or get arrested

if they take it to the market.

The former chief minister and general secretary of the All-India Anna Dravida Munnetra Kazhagam (AIADMK) Ms. Jayalalitha has recently urged the union government to revoke the ban order issued on July 11 this year.

She was reported to have stated that the order issued by the Ministry of Environment, headed by T.R Baalu had caused grave injustice to the fishermen in the state.

The General Secretary of the Communist party of India, Sankaraiah has also opposed the ban and called for the withdrawal of the notification by the union government.

Those connected with fisheries in Kanyakumari district point out that the fishermen in the district have traditionally been engaged in shark fishing a long time ago. The stretch of hamlets right from Neerodi to Eravainthuari in the district with a population of 15,000 families depends on shark fishing. Similarly the fishermen belonging to Thoothukudi district depend on conches and the fishermen from Manadapam depend on catches of sea cucumber.

Sharks earn foreign exchange. Shark fins are exported to countries like China and Japan. The local community has used the flesh. Corals are used by the cement industry.

Recently a massive protest rally was organized in Nagercoil, which was led by leaders like Thomas Kochery and Vivekanandan, the latter hailing from Karimana in Kerala.

Dr.R.S.Lal Mohan, former Principal Scientist with the Central Marine Fisheries Research Institute (CMFRI) pointed out the futility of the ban on shark fishing. He said that apart from Kanyakumari district, a large number of fishermen are engaged in shark fishing in places like Elathur in Kerala. While shark fins are exported, local communities in places like Calicut where shark curry is a favourite during marriage functions, consume its flesh. Shark 'puttu' (steam cake) is also sold in

hotels.

Though one favourable point that can be put in favour of the ban is that the shark population has been dwindling world over. But imposing a ban on shark fishing cannot be implemented as the sharks will be trapped in gill nets, hook and line and trawl nets cast by the fishermen for catching high priced varieties of fish. For putting an end to the shark fishing, the nets should also be banned. But is this possible, he questioned.

If the shark fins cannot be exported the sharks which were caught will have to be thrown away or sold locally. This will not serve the purpose of the ban on the conservation point of view and at the same time it will put the fishermen into hardships, he pointed out.

Meanwhile, according to representatives of fishermen, when the notification on banning shark fishing is enforced in the State it will add to the woes of fishermen and hence they urged the union government to revoke the ban.

Ban on fishing: BJP leader's plea to the Centre

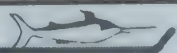
Following the Centre's ban on shark fishing, the fishermen in Ramanathapuram district were put into great hardship and the central government should reconsider its ban, said S.L.Pandian, the Ramanathapuram district general secretary of the Bharatiya Janatha Party. He made this observation at a meeting of the Ramanathapuram district wing of the BJP held at Mudukulathur to review the results of the local bodies election.

Ban on Shark fishing futile, say fishermen

Deep sea fishermen Association in Kerala and Kanyakumari district have appealed to the state government and the state fisheries department to convey to the union government the fact that the recent ban on shark fishing will ruin the fishing activities and will take many fishermen to penury and poverty.

The Association in their representation





to the state fisheries commissioner detailed the futility of the ban stating that the fishermen hardly knew what was in the net before it was hauled onboard. Moreover, among 300-odd species of sharks found available in our seas, only 8-9 species were netted by the shark fishermen. On one hand the Marine Products Export Development Authority of the Union government offered assistance to purchase specialized fishing equipments and gears such as Global Positioning System (GPS) for deep sea fishermen and on the other hand the Environment Ministry of the same Union government banned shark fishing.

Deep-sea fishing is a select trade even among the fishermen of Tamil Nadu State. There are about 250 families in Thoothoor and neighbouring villages in Kanyakumari district who have traditionally taken to shark fishing. Using reinforced traditional fishing craft, the fishermen venture over 150 nautical miles into the sea in search of catches. Deploying only long line and hooks, the currently recommended practices for sustainable fishing, they frequent deep-sea waters off Kerala and Gujarat too.

Apart from conducive weather, the shark catch may vary with season. It was good between August and December, moderate between January and March and abysmally low during the remaining months.

The state fisheries department's secretary D.Rajaendarn, IAS, said that the government was aware of the plight of fishermen in the state and it is proposed to take up the issue with the union government after having a thorough discussion with the state environment department.

Officials were aware that the ban could bring about an ecological imbalance in marine resources since the sharks are predatory in nature and is high in the food chain.

World over only the blue-eyed shark featured in the list of endangered species of marine life.

The 'gill net' fishermen in Andaman and Nicobar Islands slice off the fins of sharks and release back the sharks into the sea and this practice could have resulted in the union government taking the extreme step of clamping the ban on shark fishing, said Vincent Jayan, the chief co-ordinator of the Deep Sea Artisanal Fishermen Association of Thoothoor.

Shark potential not fully exploited

Shark harvesting constitutes less than two per cent of the total marine fish landings in the country. The exclusive economic zone (EEZ) has an estimated potential of 1.68 lakh tonnes of elasmobranchs that include sharks, rays and skates. Against the potential, the average annual catch between the period from 1987 to 1999 was 61, 591 tonnes, according to a status report on the pelagic sharks in the EEZ of India prepared by the Central Marine Fisheries Research Institute (CMFRI).

The report assumes significance following the ban notification on shark, ray and skate species by the union ministry of environment.

Following protests and representations from the fishermen from all over the state, the chief minister, O.Pannerselvam wrote to the Prime Minister on November 16 calling for a review of the ban. He sought a serious discussion among the stakeholders, the Central Ministry, States and experts, especially the CMFRI.

The report submitted to the Union Ministry said that of the total production during the period from 1987 to 1999, the estimated average annual shark catch was 41,483 tonnes only. Gujarat led the country in shark production with 16, 589 tonnes (40 percent) followed by Maharashtra 7,302 tonnes, Tamil Nadu 5,120 tonnes, Andhra Pradesh 4,708 tonnes, Kerala 2,852 tonnes, Orissa 1,487 tonnes, West Bengal 1,279 tonnes, Karnataka 1,082 tonnes, Andaman and Nicobar islands 622 tonnes, Lakshdweep 189 tonnes, Goa 186 tonnes and Pondicherry 68 tonnes.

In general, the West Coast accounted for about 69 per cent of the landings. The zone-wise composition indicated that the north-west coast contributed 54.3 percent, southwest 11.7 percent, southeast 25.2 percent, northeast 7.1 percent, Andaman and Nicobar 1.3 and Lakshadweep 0.5 percent.

On fishing gear, the CMFRI report said that sharks were caught with hook and line, gill nets and trawls. An improved version of hooks on long-liners using mechanized gear proved effective in capturing larger fish including sharks.

The marine fishing fleet increased from 0.15 million in 1992 to about 0.238 million in 2000, including 35,730 motorized traditional fishing craft and 47,000 mechanized boats. In

addition, 170 large fishing vessels of 20 metre length were operational.

However, the concentration of fishing activity was within an 80-meter depth and shark fishing continued to be considered as a bye-catch. No exclusive gear was deployed except the large meshed-gill nets, hook and line.

Despite the potential, certain species such as whale shark and juvenile sharks require safeguarding against the exploitation, concludes the report.

Assurance to fishermen on providing amenities

Nagarajan, President of the Fishermen's Association, Nagapattinam district submitted a charter of demands to the district collector, Sudeep Jain, during a grievance day camp held at Tharangampadi (Tranquebar) recently. They demanded that an overhead water tank should be built with a carrying capacity of one lakh litres per day and a fishermen's co-operative stores need to be established. Link roads need to be constructed near the seashore for easy transportation of fish and a barricade wall should be built to safeguard fishermen's houses from sea erosion.

Permanent doctors should be appointed at Thranagambadi government hospital and housing quarters need to be provided to the doctors so that they can stay and look after the needs of the people.

A community hall should be constructed to benefit the fisherfolk. A fish tanning centre, fish net mending hall and a hall for drying fish were the other demands of the fisherfolk of the district.

Nagarajan told the collector that the fishermen were languishing without even basic amenities.

The collector said that immediate action would be taken on the demands that come under his purview and the other demands would be recommended and forwarded to the authorities concerned. He added that the public must have awareness about various welfare schemes of the government.

Kalaiaarasi, Revenue Divisional Officer, R.Mahalingam district Public relations Officer, Arockiasamy Tahsildhar, Tharangambadi and other officials participated in the meeting addressed by the collector.

Abdul Kalam, Assistant Director of Fisheries welcomed the gathering. ☺☺☺

West Bengal Newsletter

From P.K. Samanta

Current Scenario of Fishery Sector in West Bengal

West Bengal has a long history of traditional fish farming practices and it has played over years a model role for sustainable aquaculture. With 2526 km length of rivers and canals, 2.76 lakh ha of beels, oxbow and derelict water bodies and 4.05 lakh ha brackishwater area, the State holds great potential for diversified fishery development.

Mr. P.L. Behera, General Manager, Regional Office of NABARD, Kolkata, has reported that about 1.1 million fishermen in the State are now engaged in fisheries sector, representing about 0.67% of the population of the State. No doubt, the demand for fish in the State is very high, the per capita fish consumption being 15.6 kg as against the world average of 13 kg. The demand and supply gap is projected to be 1.63 lakh t by the year 2002. The State commands a major inland fish market and is strategically located in the trade route of inland fish movement from Southern, Northern and Western production centres to the Eastern and North-Eastern markets of the country. Despite all these favourable factors for growth of the inland fishery sector in the State, the credit flow to the sector has taken a downward swing and it is a matter of serious concern. Mr. N.Chaturvedi, Principal Secretary, Deptt. of Fishery, West Bengal feels that, as fishery sector of West Bengal, continues to play a prominent role in rural development and poverty alleviation, it is necessary to conduct a purposeful review the progress of fish culture in the State.

Alarmingly, in a recent report, the Land Reforms & Revenue Department, Govt. of W.B. has focused that about 57 thousand ha of agricultural land has been diverted unlawfully for Bhery fishery or other types of fishery activity. Mr. S.N.Ghosh, Secretary of the concerned department, in his official note, is understood to have pointed out that this unlawful fishery activity is primarily noticeable in North & South-24-Parganas districts of West Bengal. Ghosh has also indicated that about 88 thousand ha of area is covered by fish culture in both the two districts. Of these, about 30 thousand ha of area are covered by fish culture from times immemorial and the rest 57 thousand ha have been developed during the last 50 years. In the later category both fish culture and Aman Paddy cultivation co-exists. In a survey report of mid-1980 it was recorded that fresh water prawn culture activity started from that time in the form of polyculture with fish in those areas. Some solvent investors have taken up

land from marginal farmers by paying a lump sum amount of money to them.

Ghosh has specifically pointed out in his official note that this type of fishery activity is causing serious damage both to the land and its productivity for raising paddy crop. To stop this corrupt practice the secretary has also suggested an enactment as early as possible. In fact, various types of inland fishery activities of the existing and new units including the fish farming practices of World Bank projects of the State Government are also going on in the State in violation of the guidelines and official approval of the Aquaculture Authority in this regard, is alleged.

Large Scale Giant Fresh-water Prawn Farming

Fresh water resources in the State suitable for development of fish culture are estimated to be 2.76 lakh ha of which 2.10 lakh ha have already been developed, leaving a balance water area of 66,000 ha for development. In addition, additional water resources are being added in the Darjeeling district by way of conversion of flowing water resources into confined units known as "Jhora Fishery". So far 2990 such units have been developed in the area.

With the tempo of brackishwater shrimp farming in West Bengal coming to grinding halt in 1996-97, the interest of farmers came to be diverted towards development of freshwater prawn aquaculture. During the past few years, several new farms engaged in this line have been developed. The dominant freshwater prawn species chosen for culture is the giant freshwater prawn, *Macrobrachium rosenbergii*, commonly called as "Scampi". Field study conducted by the sub-Regional Office, MPEDA, Kolkata indicates that in recent years aquafarming of giant prawn is gaining momentum because of higher returns as compared to culture of any other species in freshwater areas. The giant freshwater prawn has added advantages of fast growth, attractive appearance, better meat quality and high compatibility for mono-culture or poly-culture with freshwater fishes. With its vast resources of freshwater and low saline brackishwater areas, one million nos of freshwater ponds, swamps and beels covering an area of 276,000 ha, a good part of them can be made suitable for freshwater prawn cultivation, by way of polyculture or otherwise.

At the Rahara Research centre (ICAR), freshwater prawn yield is reported @ 499.8 Kg/ha/8 months. In Canning area of South -24-

Parganas district, experimental paddy plots in three months khariff crop, prawn and fish yield has been reported as 500-600 kg/ha where contribution of prawn is about 40%. In Minakhali-Malancha area fish farmers have opted for paddy cum fish/prawn culture based on traditional system. The average yield of aqua crop from the system has been reported as 825.7 Kg/ha/7 months with contribution of prawn at about 0.5%. However, *M.rosenbergii* along with carps under polyculture system, at density of 500, 750 and 1000 nos/ha, are stated to have yield rates of @13.5 kg, 20.25 kg and 27.0 kg/ha/year respectively. Prawn production from pen culture in Wetlands under the management of Fishermen Co-operative Societies and Supervision of CICFRI ranged between 788 and 1000 kg/ha/4 months. Marine Products Export Review indicates that during 1997-'98 West Bengal exported 751 mt of Scampi out of the product from 1787 mt of total exports of India and in 1998-'99, export of frozen Scampi from West Bengal was 729 mt valued of Rs.32.59 crores only.

According to Dr. A.S. Upadhyay and Dr.D.Roy, Sub-Regional Centre, MPEDA, Kolkata, Scampi seed availability of uniform size in required quantities at right time is highly essential for its culture. In West Bengal, juveniles of giant freshwater prawn are abundant in river Hoogly and its tributaries. A field study indicates that the collections of freshwater prawn seeds are commonly made from different rivers of W.B. as detailed here under.

Midnapore District

i) Haldi river, at Narghat, Haldia & Terapekhia ghat during June to September.

ii) Keleghai river, at Patashpur & Egra and Khejuri & Kalinagar area during July to October.

iii) Kangshabati river, at Srirampur, Dobandi, Rajgachhala & Ramchandrapur area during June to September.

iv) Chandi river, at Sabang, Pingla & Moyna during June to September.

v) Rupnarayan river (lower part), at Kolaghat during July to September.

vi) Silabati river, at Ghatal during April & May.

vii) Subarnarekha river, Rajghat & danton area during July to September.

North 24-Parganas District

i) Ichamati river, at Baduria, Swarnupnagar, Gaighata & Itindaghat during June to October.

ii) Bidyadhari river, at Nazat during July to September.

Hoogly District

i) Mundeswari river, during April to June.

ii) Darakeshwar river, during June to August, seeds are sold at Bandarghat, Tunirghat and Garerghat.

Nadia District

i) Hoogly river near Chakda area during April to June.

ii) Churni-Mathabhanga river, seeds are available at : Benali Bazar, Harikhali, Balikamari, Mathabhanga, Ranaghat, Simurali, Hanskhali, Swarnakhali & Majdia during June to September.

Murshidabad District

i) Jalangi river, during June to September and,

ii) Paglachandi river, during July to September.

Wild Scampi seed are generally available from the month of April to September with peak during July-August, from the different rivers. The demand of Scampi seed is primarily met by collection from the wild with an average rate of Rs.500-800/- per 1000 nos. Monoculture of giant freshwater prawn in certain areas of West Bengal, namely Khamargachi and Balagarh in Hoogly district, Tentulia, Balisai in Midnapore district is gaining in popularity. The culture practice involves drying of pond, liming, and supplementary feeding during the culture period of about 6 to 8 months (April-November). The production target usually varies from 600-1200 kg/ha. On the other hand, polyculture is undertaken in lowlying areas and shallow water bodies of 10 ha to 100 ha area with depth varying between 1-3 feet (*Bheris*). Besides, Scampi is often cultured with other freshwater fish species like *Catla catla*, *Labeo rohita* etc. with very little supplementary feeding. The crop period varies from 8-10 months with an average production of 100-200 kg/ha. A recent study indicates that at present 4180.71 ha of water area is utilized as the actual operational area under freshwater prawn farming in different districts : Nadia 457.95 ha, Burdwan 206.18 ha, Midnapore 656.96 ha, and Hoogly 461.21 ha, Howrah 212.02 ha, North 24-Parganas 993.96 ha and South 24-Parganas 1192.80 ha. Practically, supply of basic inputs for prawn culture such as seed, feed, lime, zeolite etc. are unorganized. Farmers are often misguided by local agents, dealers and retailers, supply who these inputs. There are incidents of supply of adulterated inputs like lime mixed

with paper dust or sand. There is no mechanism to control and regulate prawn farming at field level.

It is felt by NABARD that to promote freshwater prawn farming in the State it is necessary to revive WESPARC or organise a similar Agency which could provide the required technology and inputs to support this growing industry.

Fisheries Courses in West Bengal: Inequality Problems

Besides the 4 years B.F.Sc. course under the West Bengal University of Animal Sciences, the U.G.C. has given permission to the University of Calcutta, Vidyasagar University, Midnapore and Burdwan, University, Burdwan, to run 3 years Vocational Degree Course as B.Sc. (Industrial Fish & Fisheries) in the following Colleges with intake capacity upto 30 students per year after 10+2 level.

University of Calcutta : 1. Ashutosh College, Calcutta; 2. Acharya Prafulla Chandra College, New Barrackpore; 3. Brambhananda Keshab Chandra College, Ban Hoogly, Kolkata; 4. Bangao Dinbandhu Mahavidyalaya, South 24-Parganas.

Vidyasagar University, Midnapore : 1) Prabhat Kumar College, Contai, Midnapore; 2) Ramnagar College, Midnapore; 3) Sabang Sajanikanta Mahavidyalaya; 4) Hijli College, Hijli, Midnapore; 5) Sitananda College, Nandigram, Midnapore.

Burdwan University : 1) Burdwan Raj College, Burdwan; 2) Sreerampore College, Sreerampore, Hoogly.

With what is understood to be a sub-standard course and curriculum and without creating proper infrastructural facilities with regard to teaching staff, equipment, the vocational courses are somehow running under Zoology Departments of different Universities by engaging one teacher as In-charge of the course. Rest of the teachers are part-time. The broad disciplines of the course, namely Aquaculture, Fish Biology & Ecology, Aquatic Animal Health which includes Fish Physiology & Biochemistry, Fish Nutrition, Fish Pathology, Bacteriology, Parasitology, Virology, Pharmacology including Medicines, Anaesthesiology & Surgery, Fish Genetics & Breeding, Fish Processing Technology and Aquaculture Engineering, Fishery Extension etc., are not taught by qualified teachers of the respective disciplines.

It is a naked truth that there is no scope of proper employment with such a vocational

degree in Industrial Fish & Fisheries and this looming gloom threatens the students. At the same time, B.F.Sc. students of West Bengal University of Animal & Fishery Science are also relatively not much better, if one considers the situation from the point of view of prospect of employment. The long neglected Fishery Faculty of the W.B. University of Animal & Fishery Sciences is at present functioning in a dilapidated building with inadequate facilities at Mohanpur, Nadia. Through efforts of the Fishery Consultant of the University, Dr. P. Das, Retired Director of National Bureau of fish Genetics & Breeding, Govt. of India, and the active support of the enthusiastic Vice-Chancellor Dr. A.K. Bhattacharya, liaison with the State Govt, after initial 5 years long dark period of its existence, has now been established. As a result the required modern infrastructure at the Eastern Metropolitan By-Pass, Kolkata is on the anvil. The complex of the first phase (6 crore project) has been finalized, approved and initiated by the dynamic Fishery Minister of West Bengal, Mr. Kironmoy Nanda recently.

Highlights of the Research Activity on Fisheries under West Bengal University of Animal and Fishery Sciences

After assuming as the charge of Director of Research, Extension and Farms of the W.B. University of Animal & Fishery Sciences, Dr. M.K. Bhowmik, MVSc., Ph.D. is trying hard to secure sanction for various research projects from ICAR & other agencies for all the three Faculties of the University. Accordingly, during the year 2001, four teachers of the Faculty of Fishery Sciences have obtained sanction research schemes on fisheries with adequate financial assistance from different agencies, totalling 73.50 lakhs, with the names of the schemes and project leaders (given in brackets) as follows :

1) Shrimp and Fish Health Management (Dr. T.J. Abraham); 2) Integrated Management through fish, duck & pig culture in rice farming system (Dr. T.K. Ghosh); 3) Use of probiotics in freshwater aquaculture (Dr. T.J. Abraham); 4) Value addition to low cost underutilized marine fishes in W.B. (Mr. Sreekanta Sarkar); 5) Determination of threatened status and cytological characterization of fish species in Nadia & Howrah districts (Mr. T.S. Nagesh)

While schemes 1, 2, 3 were funded by ICAR, schemes 4 received funds from Minister of Agriculture and scheme 5 from department of science and technology, Government of West Bengal.



Some of our best assets are always frozen.

Undoubtedly, one of India's most valuable assets is its seafood. Exported to more than 72 countries the world over, Indian seafood brought in foreign exchange to the tune of US\$ 1.2 billion last year.

Processed and packed to the exacting HACCP and EU standards, Indian seafood today commands a premium in the quality-conscious export markets. Small wonder then, for more and more discerning buyers, India is becoming the most preferred seafood sourcing destination.



The Marine Products Export Development Authority
(Ministry of Commerce & Industry, Govt. of India)
P.B. No.4272, Panampilly Avenue,
Cochin - 682 036. Ph: 0484-311979, 312812
Fax: 0484-313361, 314467, 312812
E-mail: mpeda@mpeda.nic.in

Call your distributor to obtain any of O.S.I.'s premium quality hatchery feeds:



Southern India
Aquaculture
No.8 Giri Road, T. Nagar
Madras 600 017, India
Tel: 91 44 825 2752
Fax: 91 44 825 9524

Hermes India (Madras)
117, Nyniappa Naicken st.
Madras 600 003, Tamilnadu, India
Tel: 91 44 5353482
Fax: 91 44 6477223

East Coast Marine Products and
Supplies
Parulika 17, Daspalla Hills
Visakhapatnam 530 003, India
Tel: 0891-563982
Fax: 0891-567090

O.S.I. GIVES YOU THAT SUCCESSFUL EDGE FOR TODAY'S COMPETITIVE MARKET

O.S.I. Brine Shrimp Eggs have a 90% or greater hatch rate in 24 hours. The resulting Nauplii (baby brine shrimp) contain approximately 61% protein and are rich in important fatty acids. The result for your fish or shrimp is fast growth, good coloration and great survival. O.S.I. Hatchery Feeds include Brine Shrimp Flakes, a micro-encapsulated, high-fat diet called A.P.R. (Artificial Plankton-Rotifer), and Spirulina Powder. Using these diets greatly enhances your fish or shrimp's growth and survival rates while as well as reducing your feeding costs.



O.S.I. Marine Lab., Inc. 3550 Arden Road Hayward, CA 94545 USA
Tel: 510-670-0888 Fax: 510-670 0808

www.osimarinelabs.com

MADE IN THE U.S.A. ★ OCEAN STAR INTERNATIONAL

HANAQUA



your Wait for the world Class Shrimp feed is over



HANAQUA

SHRIMP FEED

Now In India...

GOLD MOHUR FOODS AND FEEDS LIMITED

India's leading animal Feed company brings you the International quality Shrimp Feed at your door step...



WORLD CLASS IMPORTED SHRIMP FEED PLANT AT YANAM



For Semi- Intensive Culture



For Modified Extensive Culture



For Extensive Culture

Product Features :

- Scientifically formulated for balanced & complete nutrition
- Rapid growth and faster weight gain of Shrimps.
- Excellent water stability, attractability and palatability.
- Manufactured in 100% imported plant as per Hanaqua Technology.



GOLD MOHUR FOODS AND FEEDS LIMITED

ENIKEPADU, VIJAYAWADA - 521 108, PHONES : 0866-842462, 842412 FAX : 842432

The Net of Shrimp farmers bulges thanks to EXTAVIT - AX!



Use EXTAVIT - AX

Reap a Golden harvest of Quality Shrimp



The revolution triggered by HIGASHI multiply the harvest and make it remunerative!

A well fed shrimp is a dinner delicacy!

HIGASHIMARU Feeds(India) Ltd is the pioneer aqua feed manufacturer in India with Japanese collaboration. HIGASHI Feeds are the outcome of continuous and dedicated research conducted at its in-house R&D centre and trial farms. HIGASHI Feeds are scientifically formulated, water stable, eco-friendly and economical too.

EXTAVIT-AX, the major breakthrough by the R&D is the feed for adverse culture conditions. It is geared to fight environmental stress conditions with the help of vitamins, minerals, essential fatty acids, phospholipids, carotenoids, glucans and other immunostimulants.

Used by Aqua farmers all over India with satisfaction and profit.



HIGASHIMARU FEEDS (INDIA) LIMITED

Factory :- Thuravoor P.O. - 688 532, Cherthala. Alappuzha
Phone : 91-478-562470/ 562846/563273 Fax : 91-478-562747
email : amalgam@vsnl.com / hfilkut @ md3.vsnl.net.in
Regional Off :- 40-1-142-A. Malika Apartments 1st floor,
Labbipet, Bunder Road, Vijayawada - 520010. A.P.
Phone : 91-866-474250 Fax : 91-866-474250.

DEDICATED TO SUSTAINABLE AQUACULTURE